Class BF131
Book .W5
Copyright No.

COPYRIGHT DEPOSIT.

JUN 14 1909

THE MENTAL MAN

AN OUTLINE OF THE

FUNDAMENTALS OF PSYCHOLOGY

BY

GUSTAV GOTTLIEB WENZLAFF, M. A.

PRESIDENT OF THE STATE NORMAL SCHOOL
SPRINGFIELD, SOUTH DAKOTA

NEW YORK
CHARLES E. MERRILL CO.

BF 131
.W5

Copyright, 1909
by
CHARLES E. MERRILL CO.

LIBRARY of CONGRESS
Two Copies Received
JUN 14 1909
Copyright Entry
June 14, 1909
CLASS A XXc. No.
241908
COPY B.

PREFACE

The object in producing this work is to present the subject in a concise and clear manner, yet make its scope sufficiently wide to include, in the main, all proper mental phenomena. Aside from this, if the author has been dominated by any one idea more than by another, while writing this book, it is that the treatment should be such as to make the reader feel that the subject has relation to the actual conditions of life. The point of view is not that of the schoolmaster or theorist or that of the devotee to the laboratory merely. It was the author's aim to reach out a little into the verdure of "life's golden tree." Psychology is not a logic, describing and explaining the processes of correct and fallacious thinking; nor a discussion merely of apperception, or the manner in which knowledge is acquired and expanded; nor merely a laboratory handbook of psychophysical measurements; but psychology is a science that should also show us the mind of man growing, striving, moved and moving, consciously and mysteriously working and ever fluctuating and varying, often even to a pathological extent,—in short psychology should be the story and discussion of the Mental Man.

To a large class of people—which, unfortunately, is only too large—psychology suggests a purely academical study, and one that is either distressingly vague and learned, or so simple and commonplace as to be worth-

less. Nevertheless, psychology is a very important study. All that is known and felt is through and in mind; likewise all human action springs from the inner nature of man. Psychology is, therefore, a basic science, if truly made a study of the mind in its entirety, and it should be familiar to every man interested in getting a deeper insight into the life of the race, society, and its individual members.

But psychology is not for babes. It is a serious study, and in spite of all pains, on the part of the writer, to be simple and concise, it requires effort, on the part of the novice in these matters, to understand.

This book is not intended to be an exhaustive treatise on the subject. The author has painted with a large brush, having in view, for the most part, the essential outlines, rather than the details. If time and inclination permit and demand more detail, it will be found profitable for the student to consult special treatises on the various subjects with which general psychology has to deal. Many references to such works are given in the footnotes of this book.

While in the execution of his task, the author of this book has not hesitated to use familiar facts found in works readiest at hand, as well as material of his own, yet he trusts that in no important instance has he failed to make proper acknowledgment. Especially does he wish to express his indebtedness for courtesies extended while preparing this book to Professors E. C. Sanford, L. F. Barker, Joseph Jastrow, J. L. Seaton, M. W. Calkins, J. H. Tufts, and J. R. Angell.

G. G. W.

June, 1909

CONTENTS

CHAPTER I

Introduction

Interest in Psychology. Importance of Psychology. Future of Psychology. Development of Psychology. The New Psychology. Psychology Defined. Scope of Psychology. Mental Pathology in Psychology. Aim of Psychology. Methods in Psychology. Introspection. Objective Method. Comparative Method. Experimental Method. Differences between Psychology and the Physical Sciences.

Pages 13–21

CHAPTER II

The Physical Basis

Mind in Body. What is Life? Protoplasm and the Cell. Irritableness of the Cell. The Nervous System and the Neurone. Two Kinds of Neurones. Neurones Separate but Related. Neurone Activity. Five Classes of Neurones. First Class. Second Class. Third Class. Fourth Class. Fifth Class. Summary of Functions of Neurones. Course of Impulses. Reflexes. Reaction-Time. Reaction-Experiments. Results. Growth and Degeneration of Neurones. Anatomy of Nervous System. Nerve-Endings. Organ of Smell. Organ of Taste. Organ of Hearing. Labyrinth. Organ of Sight. Retina. Accommodation. The Spinal Cord. The Brain. The Medulla. The Cerebellum. The Cerebrum. Topography of Brain. Cortical Areas. Visual Center. Auditory Center. Olfactory Center. Taste Center. Somæsthetic Area. The

Motor Centers. Association Areas. Phrenology. The Nervous System a Unity. Conditions Influencing Consciousness. Relation of Physical and Psychical Processes.

Pages 22–49

CHAPTER III

The Conscious Life

Characteristics of Consciousness. How Consciousness is Detected. Isolation of Consciousness. Consciousness must have Content. Development of Consciousness. Conditions of Wakefulness. Fluctuations of Consciousness. Sleep and Dreaming. Consciousness and Muscular Change. Sensations and Mental Content. Change and Consciousness. The Mind. Synthesis Unconscious. Inspiration. Will and Subconscious Activity. Dual Character. Unconscious Impressions. Deferred Impressions. Revivable Impressions in Unconscious Background. Habit and Unconscious Activity. Unconscious Causes of Mental States. Minimum of Consciousness. The Explanation. Value of Consciousness. Significance of the Subconscious. Consciousness a Positive Factor.

Pages 50–70

CHAPTER IV

Will

Activity—Will. Consciousness and Will. Varieties of Will. Involuntary Attention. Selective Will. Selective Will in Thinking. Kinetic Will. Development of Will. Control of Voluntary Muscles. Direction of Consciousness: Attention and Thinking. Will Defined. Will Analyzed: 1. Idea. 2. Correlation of Idea and Muscles. 3. Consent or Inhibition. 4. Motive. Motive not Apart from Act. Motives the Spontaneous Output of Mind. Freedom of Will. Freedom Defined. Limits of Freedom. Determinism. Spheres of Interest. Supreme Motive. Means Made the End. Physical Motives. Social Motives. Spiritual Motives. Various Simultaneous Motives. Irresolution, Suspension or En-

feeblement of Will. Aboulia. Explosive Will. Lack of Inhibition. Summary.

Pages 71–91

CHAPTER V

Habituation

Law of Habituation. Physical Law and Habit Contrasted. Growth of Habits. Mental Habits. Habituation General. Repetition and Habit. Power of Habit. Habits may be Changed. Best Method of Getting Rid of Old Habits. Rôle of Habituation.

Pages 92–97

CHAPTER VI

Heredity

Heredity a Common Fact. Hereditary Transmission of Mental Qualities and Tendencies. Illustrations. Insanity and Heredity. Heredity and Evolution. Theories of Heredity. Lamarck's Theory. Darwin's Theory. Weismann's Theory. Transmission of Acquired Characters.

Pages 98–105

CHAPTER VII

Impulses and Instincts

Old View regarding Nature of Instinct. Modern View. Impulse and Instinct Compared. Instinct in Animals and Man. Instinct to Live. Racial Instinct. Subsidiary Instincts. Deception. Acquisitiveness. Play. Imitation. Inquisitiveness. Ethical and Religious Instincts. Social Instinct. Consciousness and Instincts. Instinct and Reason. Stimuli producing Instinct-Reactions. Untimely and Atavistic Instinct-Reactions. Perverse Instinct. Importance of Instinct.

Pages 106–117

CHAPTER VIII

FEELING

Difficulty of Definition. Different Definitions and Views. Nature of Feeling. The Common View of Feeling. The James-Lange Theory. Considerations favoring Discharge Theory. Origin of Emotions. Tone of Feelings. Sensation, Tone, and Feeling Defined. Have all Feelings Tone? Feelings both Pleasurable and Painful. Intensity and Tone of Feelings. Intensity and Duration of Feelings. Feeling and Associated Idea. Bias of Feelings. Teleology of Feelings. Classification of Feelings. Sensuous Feelings. Ideational Feelings. Æsthetic Feelings. Personal Feelings. Altruistic Feelings. Morbid Feelings. Causes of Morbid Feelings

Pages 118–135

CHAPTER IX

SENSATION

Definition. Two Meanings of Sensation. Sensory Neurones and their End-Organs. Sensations Classified. Smell. Taste. Touch and Temperature. Muscular and Joint-Sensations. Sound. Sight. Similarity and Difference. Different Sensations Associated. Association Based on Functional Relationship. Synæsthesia. Intensity and Quality of Sensations. Measurement of Sensations. Personal Element. Weber's Law. Interpretations of Weber's Law. Relation of Intensity and Quality. Intensity and Pleasure-Pain. Intensity of Sensation, and Knowledge. Local Signs. Characteristic of Sensation. Spatiality and Externality. Volume. Sensations Without External Stimuli. How Objects produce Sensation.

Pages 136–150

CHAPTER X

FUSION AND DISCRIMINATION

Divisibility of the World. Fusion. Things First Known as Wholes. Earliest Experience Undiscriminated. Attention

and Discrimination. Discrimination is Analytic. Discrimination comes with Experience. Variableness of Things Help to Discrimination. Experimentation Help to Discrimination. Ability to Discriminate. Instantaneous Discrimination. Summary.

Pages 151–157

CHAPTER XI

Perception

Sensation before Perception. Sensations Experienced in Groups. Basis and Meaning of Perception. Attributes of Perceived Objects. Origin of Perception of Externality. Complexity of Perception. 1. Sensation. 2. Association. 3. Attention. 4. Interpretation. Illusion and Hallucination. Why one Perception rather than Another? Anticipation and Suggestion. Mood. Fortuity. Importance of Interpretative Process. Perceptive Value of Various Senses. Taste and Smell. Hearing. Localization. Touch. Sight. All Perceptions Illusory. Voluntary Illusions. Hallucinations, Proper and Pseudo.

Pages 158–174

CHAPTER XII

Unexplained Mental Phenomena

Psychic Phenomena. Various Phenomena Explained. Additional Principles of Explanation Needed. The Facts. Telepathy not Proved.

Pages 175–182

CHAPTER XIII

Memory

Memory has Reference to the Past. Organic Memory. Memory Proper Defined. 1. Retention. Degrees of Retention. Age of Maximum Memory Power. Basis of Retention. 2. Recall. Memory-Ideas. Memory as Imagination. Percep-

tion and Memory-Images. Recollection Variable. Basis of Recollection. Course of Reproduction. Various Explanations of Course of Ideas. Facts, not Logic, decide the Law. The Facts. The Law of Association. Secondary Elements in Association. Sporadic Reproduction. 3. Recognition. Pseudo-Recognition. Recognition and Knowing. Capacity of Memory. Kinds of Memory. Differences Accounted for. Forgetting. Hypermnesia. Memorial Integration and the Mythopœic Tendency. Amnesia. Cultivation of Memory. Mnemonics.

Pages 183–204

CHAPTER XIV

Imagination

Reproductive and Constructive Imagination. Kinds of Images. Prominence of some Kinds of Images. Types of Imagination. Visual Imagination. Auditory Imagination. Motor Imagination. Tactual Imagination. Age, Disease, and Training Modifying Factors.

Pages 205–210

CHAPTER XV

Conception

The Consciousness of Meaning. Conception. Conception Defined. Discrimination in Conception. Conception a Relating Activity. Conception an Eliminating and Selective Process. Conception a Creative Process. The Concept Universal. Conception and Imagination. Realism and Nominalism. Language Symbolized Conception. Language an Aid to Conception.

Pages 211–215

CHAPTER XVI

Thinking

Distinctive Characteristic of Man. Thinking Defined. Two Kinds of Thought-Movement. History of Deduction and

Induction. Induction. Induction as Conception. Deduction. Deduction Compared with Perception. Deduction a Specialization of Concepts. Importance of Deduction. Relation of Induction and Deduction. Mysticism. Intuition. Intuition and Reasoning.

Pages 216–222

CHAPTER XVII

KNOWLEDGE

The Problem of Knowledge. Elements of Knowledge. Knowledge expresses Relation. Knowledge and Conception. Growth of Knowledge. Knowledge Understood. Reality in Knowledge and Belief. The Idea of Reality. The Ideas of Time and Space. The Idea of Cause and Effect.

Pages 223–232

CHAPTER XVIII

SUGGESTION

Contraction and Expansion of Living Cell. Tendency of Sensory Stimuli to be Converted into Outgoing Impulses. Thought and Movement. Imitation. Inhibition. The Reality-Feeling. Suspension of Critical Power. How Hypnosis is Induced. Hypnosis Defined and Described. Suggestion Defined. Physiological Suggestion. Sensori-Motor Suggestion. Ideo-Motor Suggestion. Subconscious Suggestion. Universality and Importance of Suggestion. Mental Epidemics.

Pages 233–243

CHAPTER XIX

THE SELF

Consciousness of Self. Development of Consciousness of Self. Interests of Self. The Feeling of Identity. Theories of Self. Extensive Observation and Comparison Necessary. The

Self Changes. Cœnesthesis and Memory. Changed Feeling of Self. Alternating Personality. Example of Alternating Personality. Causes of Change of Self. Alternating Personality an Exaggerated Form of Normal Consciousness.
Pages 244–256

CHAPTER XX

Mental Types and Characters

Varieties of Mind, and Change. Tendency toward a Type. Classification of Minds. 1. Nervous Reactions. Temperament. 2. Development. Idiots and Cretins. Criminal Type. Geniuses. Originality. Cranial Capacity. Precocity. Symptoms of Degeneracy. 3. Mental Health and Equipoise. Sanity. Insanity. Insanity and Reason. Forms of Insanity.
Pages 257–266

THE MENTAL MAN

AN OUTLINE OF THE

Fundamentals of Psychology

CHAPTER I

INTRODUCTION

Interest in Psychology. An unusual interest in psychology and psychological topics is manifested of late years. It is not confined to specialists, but the reading and thinking public at large is turning its attention to facts and discussions having a direct psychological import. To be sure, this popular interest appears to be greatest with regard to those psychical phenomena that are unusual and arouse the sense of the mysterious, and those which are thought to have a bearing on man's weal and woe. That the *science* of psychology is appreciated, however, is evident from the new impetus that manifests itself in the establishment and maintenance of costly laboratories in all the great institutions of learning the world over, and the frequenting of these by hundreds of students systematically to consider and experiment on mental processes.

Importance of Psychology. More and more the opinion is becoming prevalent that life in all its manifold aspects and departments must be studied at its source; that is, all human institutions and social movements,

including the sporadic outbursts of emotion and action, are to be explained and directed into better channels by conclusions drawn from psychological considerations. The world is what it is because of forces that have shaped society, the state, religion and morals, art and literature, with their various attendant usages and institutions. The possibilities of the social world are the dynamic elements that now reside in man, and that in the past have been factors in civilization.

It is believed that a systematic study of the mind and its various activities will lead to their better understanding and a better knowledge of their significance in the everyday affairs, as well as in certain departments of science. A vagueness of the facts and a confusion of concepts in regard to them mean error in life, annoyance, misdirection of energies, and often superstition. To know one's inner self and that of others, is to know man's powers and limitations, and the laws according to which the various forms of consciousness and action arise. And this gives satisfaction and makes life fuller and freer.

Future of Psychology. Psychology, though one of the oldest of sciences, is, in its modern form, still in its infancy. Although great expectation from psychology should not be aroused, lest the impatient student of the science turn away in disappointment because of its meager positive results, we yet believe that in time to come it will do more and more to enlighten and bring a wide range of psychic facts under their proper principles.

Development of Psychology. Psychology has a long and interesting history. Its beginnings, like those of many other sciences, are to be sought in the early at-

tempts at philosophy. The explanation of mind and matter was simplicity itself. The physical world was explained by ascribing to the matter composing it a living principle, or soul, and this in turn was explained in terms of matter. That is, matter was conceived to be a living principle, or spirit, while soul (when they came to the problem) was thought to be some refined form of matter. When, however, in the course of the development of philosophy, attention was directed more and more to man himself, and especially to his thinking and willing, as in the case of the Sophists, who were Athens' teachers of rhetoric and wisdom about 400 B. C., there soon arose the beginnings of an independent psychology. It was metaphysical at first; that is, it concerned itself with problems about the soul in abstract discussions. Then, when psychologists looked to consciousness for the facts, it became descriptive. Finally psychology completely turned away from metaphysical methods and assumptions and became statistical and experimental.

The New Psychology. Psychology was many centuries old and had yielded so few positive results, especially in comparison with the physical sciences, that when the change came, the reaction from the metaphysical and descriptive methods was complete, and the *new* psychology was to have little in common with the old. This in theory; yet in fact a common-sense metaphysics or a studied one is found interwoven in every psychology, however strenuously its author may have declaimed, in the introduction, against the use of anything but facts. Experimental psychology rests and proceeds upon two broad assumptions, now generally

admitted. Of these the first is that every mental state and process is always accompanied by a nervous change or process. The second assumption is that this relation between mind and body is uniform. A psychology of *facts alone*, therefore, is only possible in the sense that Professor Lipps uses the word, when in the introduction of his psychology he remarks that "auch Bedürfnisse sind Tatsachen"—also needs are facts.[1] If chemistry makes use of a hypothetical atom in order to explain itself at all, then the atom may be regarded as fact. So while the difference between the old and the new psychology is not so great as is sometimes claimed, there is yet this great difference, that the new is experimental with a minimum of assumptions, while the old contents itself with introspection and description of the facts observed.

Psychology Defined. Definitely stated, psychology is the science that notes, classifies, and explains the phenomena of mind. This implies, first, the observation of mental states and processes, which are found in consciousness, and also the condition under which they arise in ourselves and, so far as possible, in others. These form the data of the science, which are to be classified and explained by referring them to general laws. The data are assumed as facts. They cannot be proved, neither can they be doubted; for, they are directly felt as forms of consciousness and are observed to be the accompaniments of consciousness.

Scope of Psychology. Psychology, in its widest scope, includes all mental life, be it that of man, beast, insect, or the microörganism. What interests us mostly,

[1] *Grundtatsachen des Seelenlebens*, Bonn, 1883.

however, is the psychology of our own selves, and thus the word psychology is applied to that of human beings, unless otherwise specified. It is the province of psychology to consider, not only the mental life of the normal adult, but also the development of the human mind—psychogenesis; the conditions under which mentality takes place—brain and nerve physiology; and the possibilities of pathological conditions—psychiatry.

Mental Pathology in Psychology. It may be objected that pathology of the mind belongs elsewhere, just as diseases of the body have no place in physiology. Besides, "it is not necessary to psychological insight to make an anthology of mad-house and hospital stories." [1] On the other hand, the view is here taken that the consideration of just those exceptional cases (anomalies) and abnormal conditions will give the broadest and deepest psychological insight. For, psychology is the science of mind, and mind is not a static, rigid entity working in strictly fixed grooves, as we shall see later, but a potentiality as well as a manifestation that varies in degree and kind. There is no absolute, normal mind; there is only an approximation, in different individuals at different times, to what we may be pleased to call normal. The abnormal or pathological is nothing new, but an exaggerated form of the common, everyday normal condition or form of consciousness. Hence the absolute necessity for considering the anomalies and abnormalities of the mind, if we are ever to get beyond scholastic shallows. Furthermore, the Coleridges, Poes, Cowpers, Goldsmiths, Schopenhauers, and hundreds of other persons in the world can be understood only in the

[1] Bowne, *Introduction to Psychological Theory*, New York.

light of pathology. A knowledge of the pronounced peculiarities will enable one to understand more easily those less noticeable; and knowledge of variations from the average normal often essentially modifies one's view of the normal mind, just as one's concept of water is changed by knowing that under certain conditions it solidifies or turns to vapor.

Aim of Psychology. The aim of psychology is primarily truth; not a mere enumeration of the mental phenomena, but an induction of principles. With our practical tendencies we constantly need to remind ourselves that the line of progress in any science always lies in the direction of the most disinterested purpose and devotion to facts. Psychology is no exception to the rule, however unique its nature may be in other respects. That is not to say that psychology is to be moved into such a transcendental sphere as not to have some regard for man's natural interests. That would be a poor psychology indeed that would not take an account of the whole man, interest and all. Now, he is interested to know the constitution and nature of his own consciousness. He would like to know something of the purpose of his existence and his destiny. He is attached to life, and he desires to know what furthers this life. Hence, if psychology is to gain broader recognition, the truths that it discovers must have some bearing on man's interests. In other words, psychology must, if it can, be serviceable to man.

Methods in Psychology—Introspection. In fulfilling the work which has been assigned to psychology, various methods need to be employed. The simplest and most important is *Introspection*, or the noting of our own

mental states as they occur or as we remember them to have been. Unless the individual himself has direct experience of certain mental facts, he can never understand them in the least. To know what the sensation of blue is like, or the feeling of dismay, one must have a consciousness of them as direct experiences. No description is adequate to produce knowledge of a state of consciousness; for knowledge in all cases implies direct acquaintance with. To be sure, we may have knowledge about things from mere description, but in this case the description is in terms already known to us by direct experience.

Objective Method. While the realization of consciousness requires personal experience, which can be noted by introspection alone, other methods, supplemental to it, are necessary to extend our knowledge of the kind and intensity of consciousness and of the various circumstances under which specific states of consciousness arise. The *Objective* method is the study of other men of various types, from the imbecile to the genius; at various ages, from earliest infancy to extreme old age; with different culture, from the most primitive savage of the remotest age to the Goethes and Gladstones of today; with different constitutions, from the healthiest man down to the physical and mental wreck that is relegated to the ward of incurables. History, archæology, philology, music, literature, art, folklore and superstition, physiology, psychiatry and criminology are interesting fields in which we may gather important facts for psychology.

Comparative Method. The *Comparative* method is the study of animals, their habits, instincts, and thought,

so far as that is possible, for the purpose of helping us to put our own mental nature into a clearer light by comparison.

Experimental Method. The *Experimental* method, a form of the objective and comparative methods, is the making of observations on man and animals under conditions brought about for the express purpose of observation. Already experimental psychology—also called psycho-physics and physiological psychology—is a pretty well defined department of general psychology, for which results are furnished from laboratories equipped with all sorts of ingenious apparatus with and without names, by which the psycho-physical man is accurately determined.

Differences between Psychology and the Physical Sciences. One fact that needs to be emphasized especially is the initial difference between psychology and the physical sciences. The facts of the physical sciences must, for the most part, be imparted to the beginner of the study, while every student of psychology fortunately—in some respects *un*fortunately—is directly, though very superficially, acquainted with the great facts or data of psychology long before he takes up the study of the science. This accounts, at least in part, for the feeling often entertained that after all psychology is a very meager study. Even psychologists of no mean reputation and achievement, such as William James, are looking for a Copernican discovery that will revolutionize psychology and direct its devotees, in their researches, into the bright highway of truth, instead of leaving them to grope about in obscure byways. However, we do not expect it ever to be made, simply be-

cause the great facts of consciousness are most familiar to every developed person, and because in mind, in consciousness, we have what is for us an ultimate reality, and is not to be classed among appearances merely, as are the phenomena of astronomy. The truth is that the facts of psychology as presented in consciousness are so fundamental that even a definition is exceedingly difficult, if not impossible. The most that we may expect to attain is a wider acquaintance with the facts of mind, and a fuller understanding of the principles involved.

Although psychology is concerned about the facts of mind, or consciousness, it is, nevertheless, necessary to consider also some facts of physiology, because of the intimate relation of consciousness and the body.

CHAPTER II

THE PHYSICAL BASIS

Mind in Body. In the common acceptation of the word, man is body and mind. By body is meant the organism having weight and extension, and possessing other properties perceptible through the senses. By mind, on the other hand, is meant the consciousness, the thinking, the feeling, striving, and directing of one's own energies. Consciousness, or mind, which is the subject of our study, is only known in connection with an organized and functioning body. In other words, consciousness is only experienced in connection with life.

What is Life? What life is, cannot be explained easily; in fact, ultimately considered, that is a profound mystery. We know only the phenomena of life, or at best, in ourselves we experience life. However, we can note the conditions necessary to life. Herbert Spencer has said that life is the "continuous adjustment of internal relations to external relations." As long as the plant or animal keeps up the processes essential to nutrition and the maintenance of its internal and external structure, it lives. Let these activities cease and death ensues. The plant lives so long as it is able to draw food from the ground and air, to convey it to the various parts for use, and to throw off waste and superfluous substances. The animal (supposing it to be one of the higher order) lives so long as it can take nourish-

ment, and there continues the circulation of the blood, breathing, etc. When these processes cease, the organism, although still possessing the same constituent elements of matter, has lost that intangible factor which is called *life*.

Protoplasm and the Cell. Every living organism begins as a minute globule, or cell of matter, called protoplasm. Protoplasm is sensitive, i. e., it responds to stimuli, and possesses the power of spontaneous movement. It grows by increasing its volume from within, or intussusception, and reproduces itself by dividing into parts. Protoplasm is one of the most complex substances, and is found only in such minute quantities as to require the microscope to detect it. The cell, within which protoplasm is found and which is the smallest unit of life, varies both as to form and size. The spherical form is common to the cell, yet many other forms prevail. An animal cell measures from nine tenths of a micron to several centimeters in diameter.

A cell may maintain a separate existence, such as the amœba, the yeast cell, and the white blood corpuscle. Or cells may be of such a character and so arranged as to form a system, as found in the case of the human body.

Irritableness of the Cell. The cells with which human life begins, have the power of organizing other substances about them and of producing other cells. The result is a highly complex organism, embodying a countless number of cells and capable of various activities. Each cell responds to any stimulus in its own way uniformly, be the stimulus in the nature of light, sound, or heat-vibrations, a chemical reaction, me-

chanical contact, or an electrical current. The gland-cells respond by an act of secretion, the muscle-cells by contracting, and the sensory nerve-cells by arousing some sort of sensation.

Of the various activities in the body, consciousness is the most significant. Though the whole of the body stands in relation to the mental phenomena, that portion that concerns us in psychology particularly is the nervous system, because consciousness depends directly on nerve-substance.

The Nervous System and the Neurone. The nervous system is composed of nerve-cells and a supporting or connective tissue, called *neuroglia,* besides blood-vessels and lymphatics. A nerve-cell with all its fibrous prolongations, or so-called *processes,* constitutes the nerve-element, or functional unit of the nervous system, called the *neurone.*

Two Kinds of Neurones. Although there are two types of neurones as to form, and although neurones differ in size and form, according to their location and office in the nervous system, we may describe them as consisting each of a cell-body and two kinds of cell-processes. The one kind is short and divided into many little branches, like those of a tree; these processes are called *dendrites.* Dendrites are protoplasmic the same as the cell. The others—the axis-cylinder processes—are generally much longer than the dendrites, present fewer branches, and are usually sheathed in a medullary covering. (See Figure 1.) It is the function of the dendrites to transmit impulses to the cell-body, i. e., they are afferent; and that of the axis-cylinder process to carry impulses from the cell-body, i. e., it is efferent

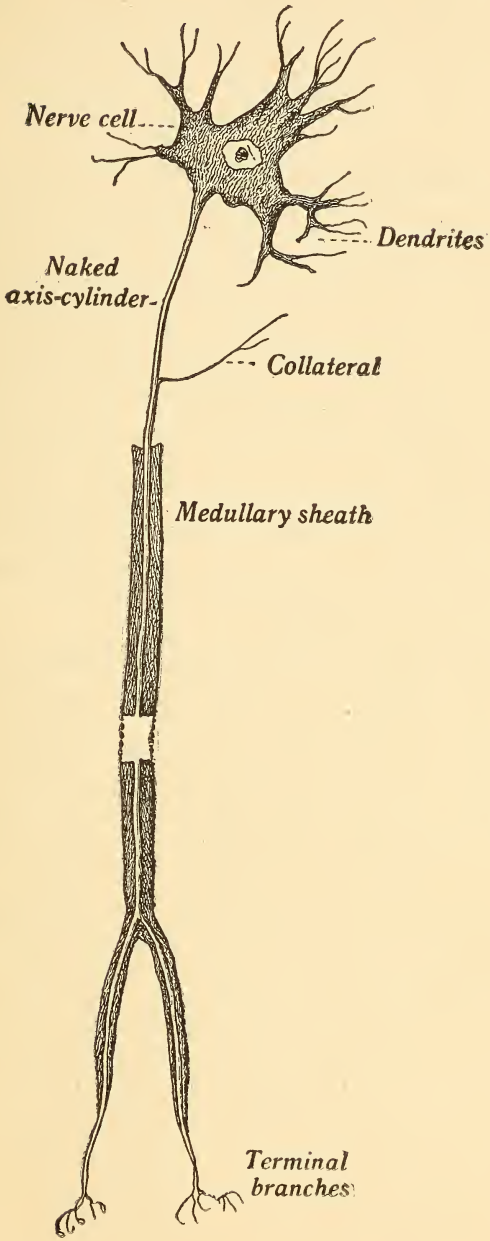


Fig. 1
Diagram of a Neurone

as regards the cell-body. However, when there are two axis-cylinders emanating from a cell, one of them may be afferent and the other efferent. An axis-cylinder process is often called a neuraxone, or simply axone.

Neurones Separate but Related. Each neurone is separate in structure, as has been demonstrated by embryology and pathology, and later confirmed by results obtained from improved methods of staining nerve-tissue preparatory to microscopic examination. In order that an impulse may pass from one neurone to another, it is sufficient that they be contiguous, though it be only through their branches, and it is thus that the neurones of the human body, estimated at eleven thousand millions, are interrelated and form an organic unity—the nervous system.

Neurone Activity. Very little is known of what actually goes on within the neurone.[1] However, as it is so delicately constituted and exceedingly impressionable, or sensitive, we may believe that it is never entirely at rest, even in sleep. Continually and without repose alterations in chemical structure are taking place in the nervous system. Ever and without interruption many stimuli, internal and external to the body, are affecting both the sensory and the motor neurones unconsciously. Only the dead neurone is in absolute repose. Yet there are moments of extraordinary activity, which arouses consciousness. When we are experiencing sensations, or when we are in the act of willing, or carrying on thought-processes, then the appropriate neurones are greatly excited; then there occurs, "as it were, a stormy

[1] See footnote, p. 150.

process in the nerve-fiber," as Barker puts it.[1] An activity within any neurone sets up a definite action in every other neurone with which it is arborized, and these in turn exercise a like influence upon their neighbor-neurones. Thus a wave of influence, called nerve-impulse, passes over the entire nervous system. While we may not be conscious of it, it is, nevertheless, actually true that we cannot view an object, for example, without a wave of influence reaching our fingertips.

Five Classes of Neurones—First Class. In describing the functions of the neurones, we may group them into five great classes.[2] The first class includes the sensory neurones of the first order. The cell-bodies of these, as well as their dendrites, lie outside of the central nervous system (brain and spinal cord). Their function is to connect the sense-organs with the central nervous system, and through their collaterals with the lower motor centers. Through these peripheral neurones the central nervous system is affected by changes taking place in and concerning the body itself, and by physical and chemical stimuli, originating in the world external to the body.

Second Class. The second class of neurones lies within the central nervous system, and connects the end-stations of the axones of the sensory neurones belonging to the first order with other parts of the central nervous system, and connects these with still higher portions of the central system. This class of neurones includes the sensory neurones of the second and of higher orders.

[1] *The Nervous System*, New York, 1899, p. 250.

[2] After Prof. L. F. Barker, op. cit.

Third Class. The third class of neurones connects the central nervous system with the voluntary muscles of the body. The neurones comprising this class are the lower motor neurones, and are designated peripheral, yet their dendrites and cell-bodies lie within the central system, while outside it are their sheathed axones, which constitute the fibers of the peripheral motor nerves.

Fourth Class. The fourth class of neurones includes the intermediary and upper motor neurones, lying within the central system. They connect with the lower motor neurones and bring these into relation with other centers.

Fifth Class. The fifth class includes the projection, commissural, and association neurones of the telencephalon, or end-brain (which is the cerebrum without the inter-brain). The projection neurones connect the cortex of the telencephalon with lower portions of the nervous system. The cell-bodies may be in the cortex, with the axones passing to the lower centers, or *vice versa*. Thus the upper motor neurones of the fourth class are projection neurones. The commissural neurones are the neurones whose cell-bodies are located in one hemisphere of the telencephalon, while their axones are distributed in the cortex of the opposite hemisphere, except in cases of bifurcation, or division of the axones, when one branch of any axone is distributed in one hemisphere and the second branch in the other hemisphere. The association neurones are those connecting the various portions of the same hemisphere.

Summary of Functions of Neurones. We see, then,

that there are neurones (sensory neurones of the first and second orders), the office of which is to conduct sensory impulses to the lower and higher nerve-centers (including the cortex of the cerebrum); neurones that bind together, associate, or unify the hemispheres and the parts of the same hemisphere (neurones of the fifth class); and neurones that conduct motor impulses from the higher and lower nerve-centers to the muscles of the body (neurones of the third and fourth classes). To make this plainer, let us consider briefly the relations of some of the principal neurones, and the course of the impulses which they transmit.

Course of Impulses. Any sensory impression, as of touch, or temperature, is taken up by the dendrites of the appropriate sensory neurones and is transmitted to the cell-body, thence ascends the axone. Now the axone branches off in collaterals, some of which enter into relation with lower motor cells directly and some indirectly. The sensory impulse is, therefore, transmitted to these lower motor cells. But, at the same time, the main branch of the axone, called the axis-cylinder, carries the sensory impulses into the medulla oblongata, and there its end arborizes around a cell, the axis-cylinder of which in the form of a fiber transmits the impulse to neurones in the cerebrum. It is probably here that the sensory stimulus is diffused or redirected by means of the commissural and association neurones. Expressed in psychic terms, the stimuli entering the cerebrum may arouse conscious sensation, perception, comparison, and thought. If the stimulus, however, is of such an intensity or nature as to have special interest for consciousness so that there is an augmentation in the brain-

centers, then there results, as it were, an overflow, and motor waves run out to various parts, thus effecting a general emotion or an indefinite movement, or both. Or incoming impulses reaching a center that is already in action may so modify the activity existing there, that the latter is either depressed and inhibited or exalted and augmented. From here the impulse is carried by the axis-cylinder process to the pyramid-cell in the cortex of the cerebrum. The impulse is here passed down its axis-cylinder to the lower motor centers in the spinal cord, which transmit it to the end-plates of the muscle-fibers. The student will do well to study carefully the diagram given as Figure 2.

Reflexes. It is clear from this that the spinal cord is a reflex center. The sensory impressions that are conducted to the lower motor neurones by the collaterals of the sensory neurones, instead of passing to the seat of consciousness, are immediately discharged as motor impulses. In other words, reflex action occurs.

While the so-called involuntary muscles act reflexively, all the voluntary muscles may also contract involuntarily, i. e., reflexively, in disease and certain forms of intoxication. Extensive incoördinate reflexes may occur under the influence of a very strong stimulus, such as pain, or when the gray matter of the spinal cord is in a condition of excessive excitability, produced, e. g., by certain drugs, as nicotin, caffein, carbolic acid, and atropin, and notably strychnin, which is the most powerful poison known to produce reflexes.

Extensive coördinated reflexes may be seen in all the

more or less complicated movements, such as reading, walking, and playing a musical instrument, occurring

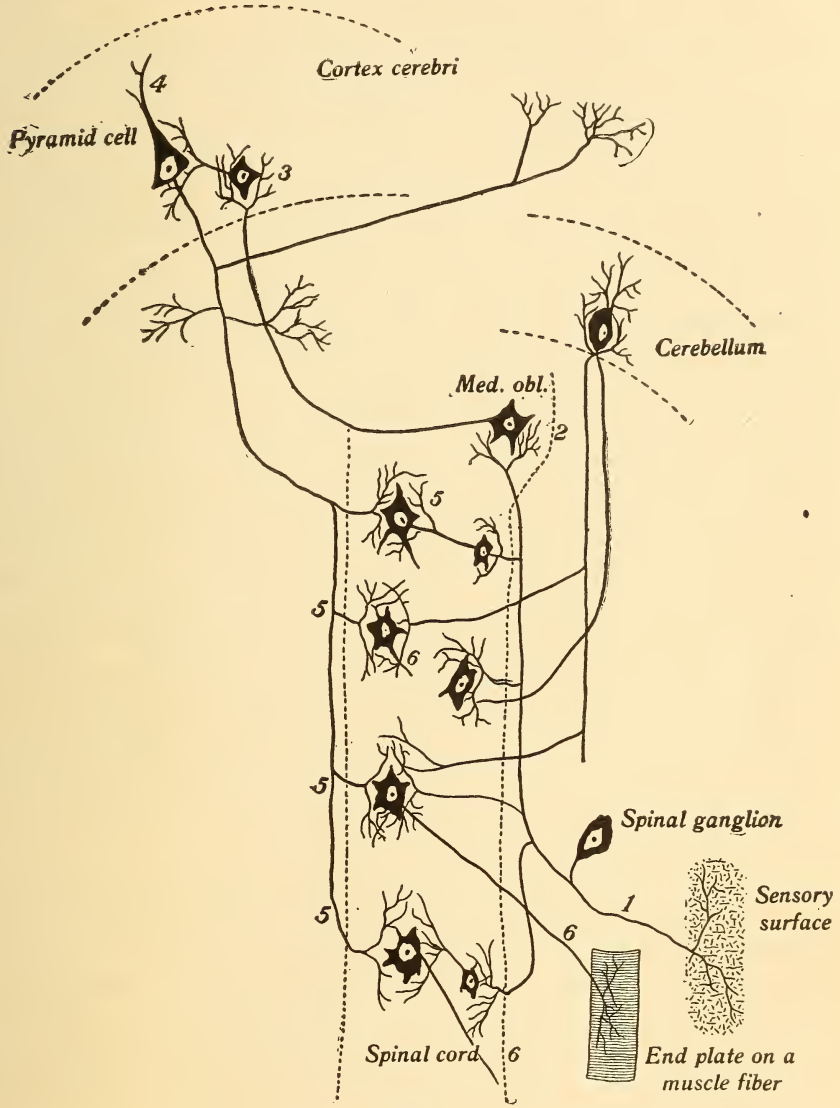


Fig. 2

Diagram showing the probable relations of some of the principal cells of the cerebro-spinal system to one another

without a consciousness of the details or meaning of these acts. A decapitated frog will use his right foot to

rub off a drop of acid applied to his skin, and if the right foot be cut off and the movements of the stump are of no avail, the left foot will be used.

Reaction-Time. The time it takes the sensory nerves to transmit a stimulus to a nerve-center, there to be converted into a motor impulse, and then to be discharged by way of the motor nerves in some muscular act, is called the reaction-time. Helmholtz was the first to experiment on sensory reactions.

Reaction-Experiments. The instrument used for measuring reaction-time is usually a chronoscopic clock, which records durations as small as one thousandth of a second. A person sits at a table with his finger on an electric key. He is told to press down the key at a given sensory signal: it may be a sound, a light, or a touch. Whatever the signal, it must be so arranged that this signal is the immediate cause of starting the chronoscope instantaneously, while pressure on the electric key instantaneously stops the machine. The interval, therefore, between the signal, which starts the chronoscope, and the pressure on the key, which stops it, is the reaction-time.

Results. Numerous experiments in reaction-time have disclosed interesting results. It has been found that the time for ordinary sensory reaction averages about 23 hundredths of a second, while it is only 123 thousandths of a second, if the subject holds himself prepared to act at the given signal. It has also been found that reaction-time differs with individuals. It takes longer for children and old and uncultivated persons to react. Practice and intense attention shorten the time, while fatigue has the opposite tendency. The

nature of the signal also makes a difference. Reaction-time for sound is shortest; then touch; and longest for light.

Growth and Degeneration of Neurones. The health, nutrition, and development of the neurone depend to a considerable degree upon its activities. Disuse brings on degeneration and atrophy. In the vertebrates having undeveloped anterior and posterior extremities, there is found a corresponding condition in the nerve-trunks and spinal roots. Amputation of a limb brings on a degeneration in the nerves that are thereby thrown into comparative inactivity. Furthermore, it is believed by some that the proper activity of some neurones, especially the cortical neurones of the cerebrum, stimulates the growth of additional dendrites, if not of new axones and entire neurones. This may explain the marked difference between the cerebrum of the untutored and that of the highly educated person. It has been thought that cerebral development manifests itself in the brain-convolutions, which seem to bear a close relation to the mental powers of an individual, as would be indicated by the appearance of the brains of the different orders of the mammalia. In support of this view it is pointed out that in some of the lower orders the convolutions are absent altogether, but that as we ascend the scale, they increase in number, extent, and depth, until in the educated man they are greatest, besides presenting the most complex arrangement. In the child the convolutions are simple and with scarce any undulations, but with the growth of his mental powers and use of his mind, these undergo change. Again, when in old age the mind has lost its vigor, the

convolutions have been thought to present a less marked appearance.

Anatomy of Nervous System. The neurones in their groupings present themselves to the anatomist as the cerebro-spinal system (brain, spinal cord, cerebral and spinal nerves), ganglia of the sympathetic system and its nerves, and, in part, the external sense-organs.

Nerve-Endings. The sensory nerve-endings are of several types, found under the skin, mucous membrane, cornea, in the tongue, nose, eyeballs, and ears. The nerve-endings for touch are corpuscles, usually described as spherical end-bulbs, which seem to consist of a cell or cells within a coil of nerve-dendrites, or consist of disks connected by fibrils within a bulb.

Organ of Smell. The nerve-endings of the organ of smell are found in the upper part of the nasal passage, and consist of distinct neurones, the so-called olfactory cells. The cell-bodies are deeply imbedded in the epithelium of the mucous membrane. The dendritic prolongations of the cells extend through the epithelial layer, accessible to odorous substances, while the axones pass inward, where they arborize with sensory nerves in the olfactory bulb.

Organ of Taste. The taste-organs, located within the mouth, are the so-called taste-buds. They are spindle-shaped cells of epithelial structure, well adapted to absorption of liquid. Spread about these cells within the taste-buds are the dendritic fibers of the gustatory nerve. It is readily seen, therefore, that the substance absorbed within the taste-buds directly stimulates the gustatory nerve.

Organ of Hearing. The ear is the end-organ of hear-

ing, and consists of the external, middle (tympanum), and inner ear (labyrinth). The outer ear of many animals assists in the collecting of sound-waves, yet it is questionable whether it serves any such purpose in the case of man. The tympanum is located back of the drum-membrane within the temporal bone. It connects with the pharynx by the Eustachian tube. Within the tympanum are found the auditory ossicles—three small bones, called the hammer, anvil, and stirrup. The function of these bones is to transmit sound-vibrations from the tympanic membrane to the oval foramen.

Labyrinth. The labyrinth consists of chambers and passages within the temporal bone back of the tympanum, and is called the bony labyrinth. The chambers and passages are described as the vestibule, the semicircular canals, and the cochlea. Within the bony labyrinth lies the membranous labyrinth. The latter is filled with a liquid, called endolymph, while the space between the bony and membranous labyrinths is filled with the perilymph. The membranous cochlea contains the so-called organ of Corti. This consists of a membrane to which are attached two rows of stiff rods, numbering 6,000 and 4,500, respectively called the inner and outer rods, or pillars of Corti; also one row of about 3,500 inner, and four rows of about 12,000 outer hair-cells. Among the hair-cells are the beginnings of nerve-fibers, which receive from the hair-cells the sound-stimuli and conduct them; their continuations constitute the cochlear portion of the auditory nerve. The vestibule and semicircular canals are also provided with nerves, which are stimulated by pressure of the endolymph as it flows in different directions opposite

to the movements of the head or body. The nerve-impulses arising here are carried along the vestibular branch of the auditory nerve, yet they have nothing to do with hearing, but are concerned in the maintenance of equilibrium.

Organ of Sight. The eye is the organ of sight. It is spherical in form, and embodies a number of features so

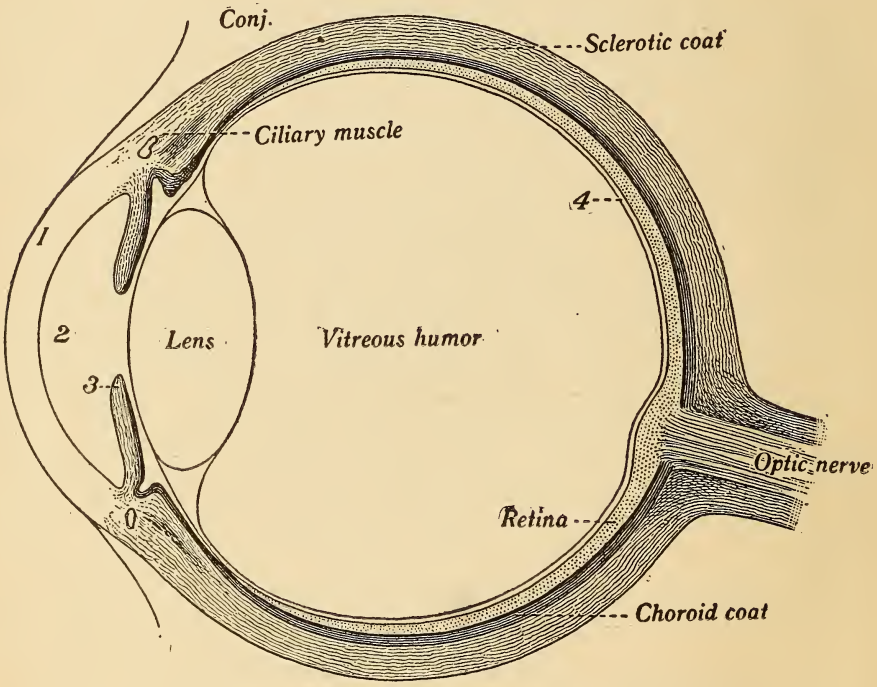


Fig. 3

1. Cornea—2. Aqueous Humor—3. Iris—4. Hyaloid Membrane

adapted to vision as to make it a most marvelous product of nature. The outer part of the eyeball is a strong membrane, the front portion of which, called the cornea, is transparent, while the rest, called the sclera, is white in color. (See Figure 3.) Underneath the sclera lies another coat, called the choroid, which is abundantly supplied with blood-vessels and presents internally a

brownish-black appearance. The choroid has an opening directly back of the cornea, called the pupil, which, by virtue of the contracting and expanding character of the surrounding region, is decreased or enlarged respectively by the circular and radial muscles. Directly back of the pupil and iris is the crystalline lens. The space between the cornea and lens is filled with the aqueous humor, while the space back of the lens is filled with a jelly-like substance, called the vitreous humor. The aqueous and vitreous humors and the lens are transparent and possess refractive power; especially does the lens possess the latter quality.

Retina. Spreading over the rear and sides of the eyeball, next to the choroid, is the retina, made up of several layers. The outer layer, next to the choroid, consists of black pigment cells. Then comes a layer consisting of a supporting, or connecting tissue (epithelium) and epithelial cells, sensitive to light. These sensitive cells are the so-called rods and cones, and are really neurones consisting of an afferent fiber, the cell-body, and the axone. It is to be noted that the afferent members are turned away from the light. Their axones arborize with another set of neurones, and these with a third set, the axone-fibers of which pass along next to the vitreous humor and then backward into the optic nerve. (See Figure 4.) The point where these fibers join and enter the optic nerve is not susceptible to light, and is known as the blind spot. The sensibility of the other parts of the retina differs. The nearer the retinal surface is to the front of the eye the less the sensibility. The point of greatest sensibility is at the fovea, a little depression in the retinal surface near

the blind spot, where the cones are not covered by the other layers.

Accommodation. A large part of the eye serves to obtain a distinct image of objects outside upon the retina, just as the most important devices of the photographic camera serve to bring a clear image upon the

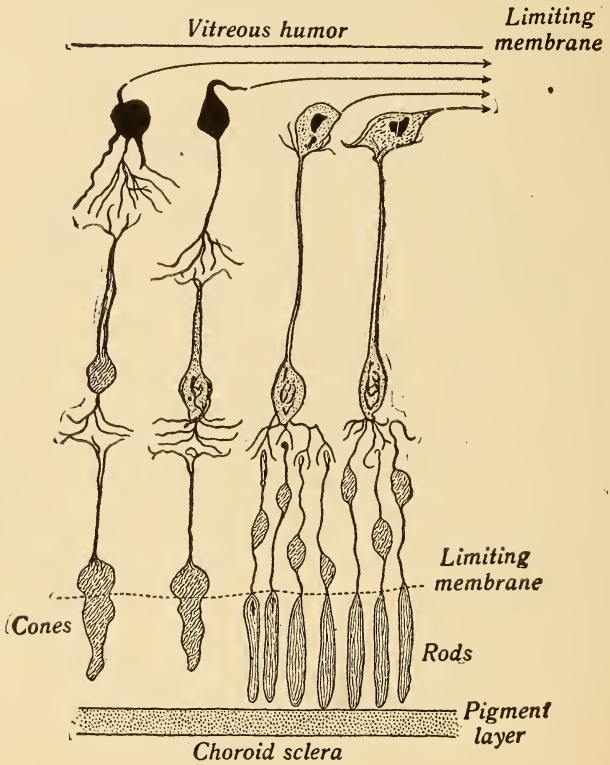


Fig. 4

Diagram of Essential Structure of the Retina

sensitive plate. Distinct vision depends on a distinct image upon the retina. The light-rays coming through the cornea and pupil must be focused, which is done by the cornea, the humors, and the lens. But in order that the image thrown upon the retina may be distinct, whether the object is near or far, there must be accommodation of the lens and pupil. When the eye is at

rest the lens is in a flattened condition, and the image of an object 6 m. or farther away will be focused upon the retina. If, however, the object is brought nearer to the eye, the focal distance is lengthened, i. e., a clear image is only possible at some point back of the retina. Therefore, in order that a clear image may fall upon the retina, there must occur an accommodation of the lens. This is brought about by the interaction of the ciliary muscles and the elasticity of the lens. The lens in itself tends to assume a more convex, or spherical form, yet when the ciliary muscles are at rest, it is ever drawn out laterally and thus flattened by the elasticity of the choroid coat and the tendons, known as the suspensory ligaments, that hold the lens in place. It is through the action of the ciliary muscles that the suspensory ligaments relax and permit the lens to spring into a more spherical form. Simultaneously the pupil also is contracted by the circular muscles of the iris, so as to exclude all rays of light except those falling upon the center of the lens. It is by these adjustments that a distinct image may be thrown upon the retina, be the object near or far.

The Spinal Cord. The spinal cord consists of many nerve-cells and nerve-fibers, the principal function of which is the carrying out of reflex actions and the transmitting of sensory and motor impulses. The exact locations of about twenty-eight reflex centers have been fixed in the spinal cord.

The Brain. The brain, or encephalon, is the organ where consciousness occurs. It constitutes about 1/45 of a man's weight. On account of its extreme sensitiveness and importance, it is exceedingly well protected.

We may distinguish in the encephalon, the cerebrum or upper brain, the cerebellum, the pons Varolii, and the medulla oblongata.

The Medulla. The medulla oblongata, also called the bulb, is an enlarged continuation of the spinal cord within the cranium, and may be regarded as the link between the brain and the spinal cord. In it are found the larger number of the centers of different organic functions, such as the respiratory center, which controls breathing; the vaso-motor center, which governs the contraction of arteries; the center of deglutition, attending to the muscles of the esophagus in swallowing; and the cardio-inhibitory center, which regulates heart-action. Probably the medulla oblongata also contains the primary coördinating centers regulating the muscles of articulate speech. In so-called Bulbar Paralysis, various disturbances of speech appear, as well as an enfeeblement and degeneration of the parts employed in speech, such as the tongue, lips, and the muscles of the vocal cords.

The Cerebellum. The cerebellum is the organ that coördinates muscular movements without consciousness either of incoming stimuli, or of outgoing motor impulses. This coördination, brought about especially by afferent stimuli from the semicircular canals and the vestibular nerve of the ears and from the sensory nerves in muscles, joints, and tendons, serves principally to maintain equilibrium of the body. Destruction of various centers in the cerebellum is attended with distinct disturbances of bodily equilibrium, such as a tendency to fall forward or backward, to this or the other side.

The Cerebrum. The cerebrum is divided into a right

and a left hemisphere by the great longitudinal fissure. The cortex, or outer portion, is enlarged by numerous convolutions, which are separated by depressions, the sides and bottom of which, as well as the outer surface of the convolutions, are composed of gray matter, called the cortical substance.

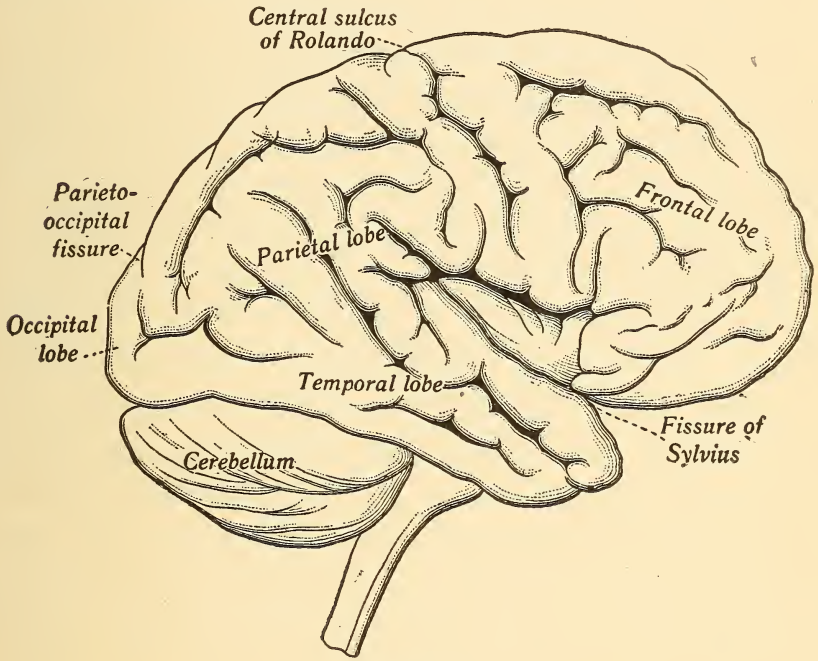


Fig. 5
Convolutions, Fissures, and Sulci of the Cerebral Hemisphere (Convex Surface)

Topography of Brain. For purposes of description each hemisphere of the cerebrum has been divided into five sections or lobes. There is the frontal lobe, extending back to the central sulcus of Rolando; the temporal lobe, lying below the fissure of Sylvius; the parietal lobe, situated back of the central sulcus of Rolando and partly above the fissure of Sylvius; the occipital lobe, below the parieto-occipital fissure, constituting the extreme

posterior portion of the cerebrum; and the central lobe, or the Island of Reil, found deep in the fissure of Sylvius. (See Figure 5.)

Cortical Areas. The neurones that constitute the cerebrum are grouped according to their function, so that certain areas of the cortex represent definite functions. There are sensory, motor, and association areas, or centers. They have been determined by long and painstaking experiment and observation. The brains of animals and men have been studied in different stages of development, and the course of many nerve-fibers has been traced. The experiments have been confined almost exclusively to animals, notably anthropoid apes, which resemble man most closely. Exposed brain-areas of these animals have been electrically stimulated and the results carefully noted. For example, if the motor area governing the muscles of the face or arms be stimulated, there results contraction of the corresponding muscles. Observations on man have been clinical for the most part. Injuries to or lesions in different portions of the brain have been found accompanied by definite mental disturbances. For example, a young man, who on two different occasions had, by falling, hurt his head in the same place, from which he never recovered entirely until he was operated upon (trephined). A portion of the brain was exposed, and there a vascular tumor was found and removed without any apparent injury to the brain. The patient recovered in ten days, but it was found that he had temporarily lost the power to coordinate and accurately to direct the movements of the right arm, including fingers, from the elbow down. When he closed his eyes, he was unable to tell what positions

were given to his arm and fingers. These parts, however, still yielded sensations of touch and temperature. The position of the cortex injured was about two inches behind the central sulcus of Rolando and about an inch and a half to the left of the median line.[1]

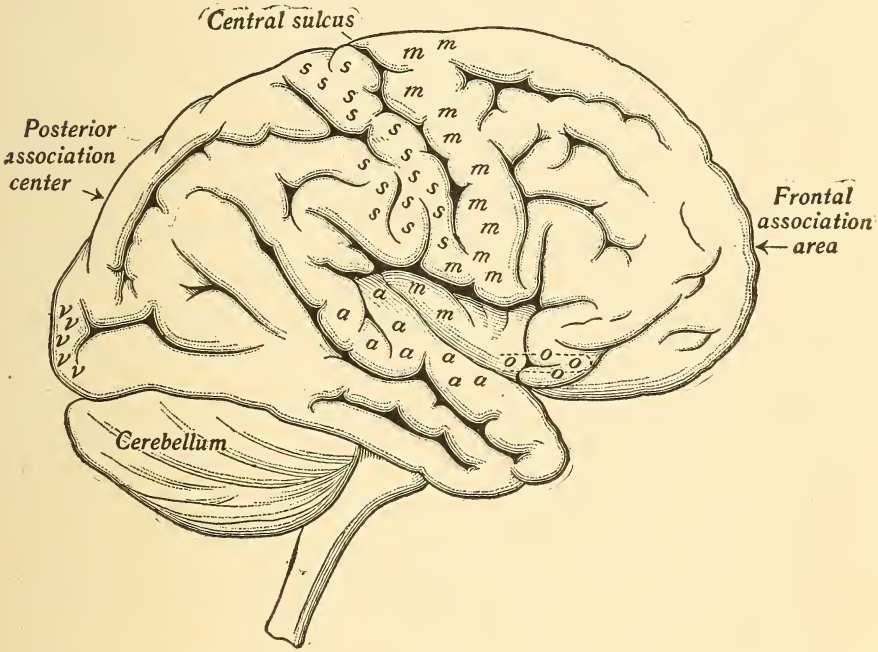


Fig. 6
m—Motor Neurones
s—General Sensory Neurones
a—Auditory Neurones
v—Visual Neurones
o—Olfactory Neurones

Visual Center. The visual center has been found located in the occipital lobes. (See Figure 6.) If this area on both hemispheres be diseased or destroyed, the patient can no longer understand objects reported to the brain in optical terms (mind blindness, in case the con-

[1] Reported by Prof. M. Allen Starr, *Psychological Review*, II, p. 33 ff.

vex surface of the hemispheres is affected), or he has lost the power to perceive optic stimuli (in case the cuneus, a lobule on the median surface of the cerebrum, is affected); while mere pressure upon the visual area, as by cysts, may produce various subjective images.

Auditory Center. The auditory sense-area is located in the upper part of the temporal lobe, called Wernicke's convolution. If this area is destroyed in both hemispheres, the patient loses entirely the power to hear and understand spoken words. This condition is known as word-deafness. A person suffering from word-deafness can, however, understand thoughts expressed in writing, just as the mentally blind understand spoken words, but not written ones.

Olfactory Center. The olfactory area is probably in the lobes at the base of the fore-brain, a part of the rhinencephalon. These are most prominently developed in the animals possessing the keenest sense of smell. It has also been found that pressure upon this area arouses sensations of smell.

Taste Center. Almost nothing is known of the taste-area. It is thought to lie immediately back of the olfactory center.

Somæsthetic Area. The general sensory, or somæsthetic area extends from the central sulcus of Rolando toward the parietal lobe. It includes also part of the mesial surface of the hemisphere. This is the center of all sensory impressions relating to the body, including the processes that occur in connection with emotions, as is indicated a little farther on (Association Centers). Disease of this area produces disturbance of tactile and kinæsthetic sensations. The patient loses the power to

recognize objects by touch and to know the movements and position of limbs and mouth, as well as to form images of movement and position.

The Motor Centers. It has been determined that on the fore side of the central sulcus (gyrus centralis anterior) chiefly lies the motor region, from which proceed the impulses that pass to the pons, medulla, and spinal cord, which effect the final discharge, causing muscular contractions. If, for instance, a portion of a monkey's skull be removed, and the cortex of the motor region irritated with an electric current at different points, different muscles of the body will be affected. Physiologists have generally held that the center that governs the muscles employed in speech, viz., of the tongue, mouth, and the larynx, is located in the lowest frontal gyrus, called Broca's convolution, of the left hemisphere in the case of right-handed persons, and of the right hemisphere in the case of left-handed ones. A lesion or injury in Broca's convolution results in loss of power to use speech properly.[1] This disturbance is called motor aphasia, or aphemia.

Immediately above the center governing the movements of the mouth and larynx, lie those of face, thumb, fingers, neck, eyes, wrist and elbows, shoulder, hip, knee and ankle, trunk, and toes. Lesion in these centers produces paralysis.

Association Areas. Finally, there are to be mentioned the association centers, which contain the end-stations of the neurones connecting the various portions of the same hemisphere. There is the anterior associa-

[1] Of late this has been doubted and the whole matter of localization of aphasia has been reopened for discussion.

tion center, located in the fore-brain, and the posterior association center, lying directly back of the motor areas. These centers take up about two thirds of the cortical area and are, according to Professor Flechsig, concerned in the higher mental processes of memory, recognition, judgment, and reflection. The posterior is concerned in the formation of ideas about the outer world, while the anterior center is connected with the somæsthetic area (including the motor region), in which area are impressed all the conscious bodily experiences, both passive and voluntary. When the latter center is diseased, the person's estimate of himself and interest in the external world may suffer changes, as certainly decided changes in his character appear. In some cases there is over-appreciation of self to the extent of unbounded egotism, while in others it is self-depreciation. The patient loses the power of judgment in matters of right and wrong conduct and in matters of taste. When disease affects the posterior large association center, the patient's knowledge of the external world becomes defective. Although retaining self-possession and self-knowledge, the patient does not recognize objects, and he is not able to name them nor to designate their use.[1]

Phrenology. Beyond this scientists can say little with certainty of localization of brain-functions. At any rate, the profusely differentiated brain-functions of phrenology appear in the light of modern science as unfounded and absurdly unscientific.

The Nervous System a Unity. While localization of functions may be regarded as an established fact, it must not be forgotten, on the other hand, that not only the

[1] Cf. Barker's *The Nervous System*, New York, 1899.

cerebrum, but also the entire nervous system is an organic whole, or unity, and not a mere collection of separate and isolated neurones and organs, each functioning all by itself and independently of the rest. So thoroughly are the parts related to each other that a functioning of any one of them acts and reacts upon all the rest, so much so that often the secondary effects upon a particular structure are more marked than its own direct action.

Conditions Influencing Consciousness. These, in brief, are the facts of the physical basis on which consciousness or mind rests. So well known is the fact of a basis for mentality in common life, that, far as the two are apart in reality, "head" and "brain" have all but become synonymous with "mind." A well-developed brain and good health mean mental power and equipoise. The amount of cortical substance is commensurate with the intellectual power of an individual. Retardation of brain-development means idiocy. While the average weight of the encephalon in a normal adult male is 1,403 grams, the brain of an idiot seldom weighs more than 652 grams. Inadequate brain-nourishment, faulty metabolism (tisssue change), improper circulation of the blood, jars, pressures on and lesions of the brain, excessive excitement and strains—each one of these interferes with the highest, normal course of consciousness. Our mood or disposition from day to day, as is well known, is dependent on health, sleep, work, air, and diet. The effects of certain drugs upon consciousness are well understood. Opium produces its own peculiar intoxication. Narcotics of various forms and taken in varying doses, may produce stupor, sleep, coma, or unconsciousness, and

paralysis. Nitrous oxide, when inhaled, causes exhilaration and laughing, while the ordinary anæsthetics (chloroform and ether) bring on complete unconsciousness. The effects of alcohol are paralytic phenomena, both physical and mental.[1] The critical power is first weakened and with it inhibition, or self-restraint and control. As control of thought and action wanes, emotional impulses take possession of the man. In his consequent carelessness and open-heartedness, he reveals his true nature. His inmost secrets are flaunted to the winds. Benumbed of all pain and anxiety, he feels the whole world is his.

Relation of Physical and Psychical Processes. While it is impossible to observe what is going on in the nervous system, yet from all that is known, it is an unavoidable inference, that for every psychical process there is some peculiar neurone-activity in the brain. In fact, as already stated, that is one of the assumptions on which scientific psychology proceeds, and which the results amply illustrate. Experiment shows that attention of the simplest kind is accompanied by marked changes of respiration, pulse, and muscles. Various experiments show that during mental activity there is a larger quantity of blood in the brain than during mental repose. The simplest experiment is the following: A person is placed on a very delicately balanced table. Now when the mind of the subject becomes more active, either emotionally or intellectually, the end where the head rests will tip down in consequence of the increased flow of blood into the brain. Furthermore, it has been experimentally established that the rush of

[1] G. Bunge.

blood is particularly to the spot that functionally corresponds to the psychic act that is then going on, to convey to it a greater quantity of nutriment. The brain-cells appropriate these substances for future use. During mental activity brain-tissue decomposes, but just how states of consciousness are connected with decomposition of tissue is not known, although there is no doubt of the fact that such a decomposition occurs in the active brain-neurones in connection with definite psychic activity, as may be inferred from chemical analysis of the excretory products, which shows a larger amount of phosphates after mental application than after mental repose.

CHAPTER III

THE CONSCIOUS LIFE

In the last chapter we briefly described the physical basis of consciousness. In this chapter we shall consider in a general way consciousness itself.

Characteristics of Consciousness. The word *consciousness* is a general term applied to the thoughts, sensations, feelings, and volitions of any being. The first characteristic of consciousness is its awareness of either something "outside" of self, or its own self. In its latter form it is self-consciousness. In both cases it is a perceiving or knowing. All that we know of ourselves and the world is *in* consciousness or *is* consciousness itself. All that we know or ever shall know of the nervous system, the basis of consciousness, is consciousness itself. Other characteristics are its peculiar and ever changing tone, or its affective aspect, and its volitional activity that in part determines its own direction and content.

How Consciousness is Detected. Consciousness is known only by itself, but its presence may be manifested through the medium of the body. We do not know, e. g., that an atom, or a flower, or a speck of protoplasm possesses consciousness. However, if the consciousness in an organism is intelligent, it may be detected by its acts, which are adapted to the end to be attained. Thus scientists, as Alfred Binet, conclude that even certain microörganisms consisting of a single cell manifest

a psychic life by the exercise of discrimination and selection in their search for food, and in the maneuvers attending conjugation.[1] In respect to the higher forms of life, that exhibit not only various sense-organs, but also complicated conduct, it hardly occurs to us to question the presence of mental qualities.

The Isolation of Consciousness. The conscious life of every being—in this respect like Leibniz's "windowless monads"—is practically, if not really, completely isolated and, from all that we know from positive demonstration, might be entirely dissimilar in different individuals. That is, it is impossible to determine or know just what is the sensation produced in others by a particular stimulus, as light vibrations. All may agree in calling the sensation that of redness, yet there is no demonstration available as to what the real feeling in each person is. However, it is a reasonable conviction as deep-rooted as life itself, and grounded on the practical requirements of our nature, that although each consciousness be isolated, the same objects and events arouse similar states in the minds of men, and, to some extent, of animals.

Consciousness must have Content. How much consciousness, if any, accompanies the early stages of physical development, is impossible to say. So gradual is the dawning of self-consciousness, that no definite time can be designated when we may say with certainty: Here consciousness begins. But it may be and probably is present in a rudimentary form even before birth. However early or late consciousness may appear, it must invariably be aware of something, even though dimly and

[1] *The Psychic Life of Microörganisms.*

indefinitely. It must express pain, pleasure, comfortableness, a something not itself, an aliveness, a striving, an acting, resoluteness, or finally feel even conscious of its own consciousness: know that it knows. A consciousness that cannot claim this much for itself, is a mythical something of which psychology has nothing to say.

Development of Consciousness. It is quite certain that the earliest form of consciousness is not the same as that of the adult. Yet just what it is cannot be remembered by anyone, but must rather be inferred. We may believe that the consciousness of the infant is, for the most part, undefined and meaningless, though fresh and intense. Undoubtedly all the sensations and feelings that are coursing through the sensitive being are merged into one undiscriminated consciousness; or as it has sometimes been described, the condition is one of "plurality of states of consciousness," or "polyideism." I have a recollection from my very early childhood, of an experience that I believe to be typical of infant consciousness. There seemed to be a diffused, undefined, general sensation, rather painful in tone, and, as it were, located in space, like a cloud, but not belonging to anything. Then by degrees there came full consciousness, and I found myself crying with pain, and carried about in my father's arms. Before being conscious, there was only dim, general sensation, but as soon as I awoke entirely, this resolved itself into *me* suffering with severe pain, carried about, etc. Thus, it may be assumed, the infant's earliest consciousness is general, but now and then it becomes specific through brief flashes of attention. The development of consciousness is the development of the power to attend to one thing, which is

equivalent to reducing general consciousness to very narrow limits.

Conditions of Wakefulness. The general conditions under which consciousness occurs, have already been noted. We may repeat that without a discharge of a sufficient intensity in the cells of the brain, there is no consciousness. While the nervous system is undoubtedly traversed continually by waves of nervous discharge, yet consciousness occurs only when the discharge has reached an intensity called threshold value. And when the discharge involves the association-centers, thus setting up more vigorous activity in the entire brain, then we may be said to be awake, and therefore to be mentally active *par excellence*. This may be shown experimentally by producing a soft, musical sound close to a person asleep, and then gradually increasing its intensity. At first the sound produces no marked effect upon the sleeper, except that it may set up a dream-process or modify the dream already occurring, but as the intensity of the sound is further increased, the person will awaken.

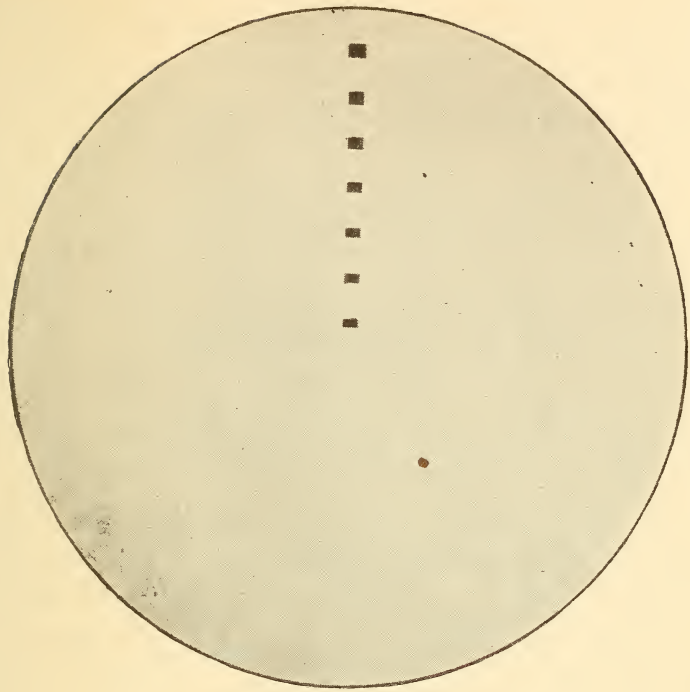
Fluctuations of Consciousness. The flow of consciousness is not uniform and continuous, but is subject to fluctuations and variations of different degrees. Sleep comes daily to the healthy person. There are, even during the waking state, moments of relaxation and comparative listlessness. This is particularly marked when wakefulness is enforced for a long period of time. Experiments performed on a number of persons [1] show that while the subjects were kept awake for ninety hours,

[1] By Professor Patrick and Dr. Gilbert. V. *Psychological Review*, III, p. 469 ff.

it took only from sixteen to thirty-five and three tenths per cent of the lost sleep to make up for the loss completely. This is accounted for in part by the supposition that the persons were partially asleep, although apparently awake all the time. In support of this, the momentary dreams experienced by the subjects, while appearing awake, is conclusive evidence of the supposition. Even at times of intense mental application there are fluctuations of the attention. Consciousness, like life in general, is not one sustained stream; it is rather the ocean with its ebb and flow, or the blood pulsing on rhythmically. After mental activity or effort comes relaxation. Uniform attention cannot be sustained for more than a few seconds at a time, as may be shown by a little experiment. A white (Masson's) disk is made to rotate very rapidly and at a uniform rate by clockwork. On a radius of the disk at small intervals are short black lines (Figure 7), which may be shortened or lengthened by means of a slide. When the disk is rotating, these black lines will appear like rings (Figure 8), black near the center of the disk, but gradually shading into gray and white as they approach the edge of the disk. The last perceptible ring is hard to detect. Alternately it is seen for a moment and then it is not, according as attention rises and falls. The experiments of several scientists[1] have established the same sort of oscillations with regard to other senses. In the quiet of night, if a watch be placed just within range of hearing, its ticking may be heard at intervals only.

Sleep and Dreaming. Sleep is nature's chief provision for recuperating the nervous system, yet what

[1] First those of N. Lange and later those of J. B. Hylan.



Figs. 7 & 8. Masson's Disk.

sleep is physiologically is still a matter of controversy. Whether the immediate cause of sleep is alone the anæmic state of the brain, or whether in addition it is the presence in the system of a larger amount of an alkaloid product called leucomaine, which results from the activity of the tissues of the body, as is held by some, we cannot here decide. However, during sleep consciousness is reduced, if not suspended, at least to the extent of closing more or less completely the avenues for sense-stimuli to enter, and motor impulses to egress, and of suspending the critical power of the mind. Even a comparatively dreamless sleep is not absolutely devoid of a sort of consciousness or feeling. The unconscious condition brought on by taking an anæsthetic feels *dead* as an object of memory compared with natural and healthy sleep. To be sure there are different degrees of sleep. We speak of the light and the deep sleep, and sleep with and without dreams. The difference, then, between wakefulness and sleep is in the intensity and extent of brain activity. In sleep there is a marked lowering of nervous activity, but generally leaving a simple process of representation to continue, or to start up, as dream-consciousness in a limited portion of the brain. Because these processes during sleep are limited, there is almost total absence of the critical attitude in dream-consciousness.

Consciousness and Muscular Change. Every state of consciousness is accompanied by muscular changes, as we shall have occasion to remark again. The nervous system is an organic unity, in spite of the localization of functions, as pointed out in the last chapter.[1] A stim-

[1] P. 46.

ulus reacts upon the whole body, as can be seen clearly in the child. The existence of an idea or feeling reacts upon the motor region. Clear consciousness, which is a state of attention, is accompanied by changes in the muscles of respiration, of the heart, face, etc. Experiments performed to determine the physical characteristics of attention, show that "the more massive spasmodic contractions and expansions of the muscles," that are continually occurring are greatly reduced and sometimes even disappear during attention.[1] Sensorial attention (of sight and hearing) is always a plain case of organic adjustment to the proper kind of stimuli. In fact, it is held by some psychologists, such as Ribot, that the physical modifications that accompany attention, are its constituent elements, or indispensable factors of attention. Thought is carried on largely through vocal, or other symbols, the representation of which imply, if not actually entail, incipient or nascent muscular changes, either of the vocal organs or the eye. Emotions have their various expressions or "attitudes," as is well known. We read in the gleam of the eye and the play of the facial lines, the steady gaze and the set jaw, the downcast face and stooped attitude, the peculiar state of the mind.

Sensations and Mental Content. While consciousness as such depends upon nervous action, which may start up spontaneously in the brain, it is given its content and furnishings, so to speak, through the avenue of the senses. What consciousness pure and simple is without sensation, or the memory of sensation, is indeed difficult to imagine. However, we have the testimony of a

[1] R. McDougall, *Psychological Review*, III, p. 158 ff.

patient, who was completely anæsthetic or insensible, except in one eye; when that was closed, he said that he felt as if he no longer existed. So important is sensation in the mental life, that a school of psychology—the Sensationalists, especially Condillac, who lived in the eighteenth century—have thought it possible to explain every idea of which we are possessed on the basis of sense-impressions. To start with, the mind, according to sensationalism, is a blank tablet (*tabula rasa*) upon which then are written the various characters of sensation (impressions), and these combined in various ways form the total content of the mind; they furnish us all our ideas, without exception, of the world, of self, of time and space, of cause and effect. One-sided and inadequate as sensationalism is in its opposition to the doctrine of innate ideas—the doctrine that we are born with full-fledged ideas—it yet has lucidly and rather exhaustively shown us the importance of sensations to the conscious life. It *is* true that organic and external stimuli arouse consciousness and furnish the mind with the "raw materials" of thought as well as acquaint us with our environments for practical purposes.

Change and Consciousness. As sensations (nerve-processes) are important in bringing about consciousness, so they are in maintaining wakefulness. To stimulate the flow of ideas, people often walk to and fro, scratch or strike their heads, and rub their eyes. The real office of these voluntary as well as involuntary movements seems to be to produce more sensations and thus augment consciousness. On the other hand, a monotonous sound, a scene with much sameness in its parts, an uneventful story, an idea kept before consciou-

ness constantly without variation,—in short, any sensation or experience continued will result in loss of interest, and induce drowsiness and possibly hypnotic sleep. When we wish to sleep we close our eyes and ears, too, and relax every muscle. The mother's lullaby leading ever to the same theme (motif) and tone, the patter of the rain, the clatter of the mill, the constant recurring vibrations of the carriage or railroad car, etc., possess the elements of monotony and rest. An important feature in bringing on the hypnotic state by the operator, is directing the subject to attend continuously to some one thing, usually to gaze intently at a bright object.

The Mind. The consciousness of a being taken in its totality, forming a continuous whole—as it were, a "stream of consciousness"—may be designated the mind, or soul. That is not to say that the mind is simply a collection of segments of consciousness. By mind we mean not mere conscious phenomena, but a force or potentiality of further conscious action running, so to speak, into depths inaccessible to and unillumined by the perceptive activity of consciousness. Or, if this figure be misleading, we are never aware of the initial mechanism or force that determines the character and direction of consciousness. This accounts for the fact that mentally we are somewhat of a mystery to our own selves. Frequently the psychic occurrences within us astonish and sometimes lead us to erroneous conclusions of our own powers and character.

Synthesis Unconscious. It is true of all ideas that they occur as finished products, so to speak, and we are unconscious of the processes that produce them. For

instance, a landscape appears to us in thought as *one* thing, notwithstanding that we come by it through a number of impressions—we have had to turn our eyes in this and that direction. The synthetic process that has given us the idea of the landscape remains unconscious to us.

Inspiration. A familiar fact is the claim to inspiration in the conception and execution of some work. The author feels his work greater than and beyond himself, and the ideas are presented in such a manner as to surprise the very mind from which they emanated. Hence the conviction that the results are not the natural output of the mind, but are inspired by an extraneous and superior power. Socrates believed that it was a demon within him that passed judgment on his contemplated acts. He also maintained that the poets were often entirely ignorant of the deeper truth and beauty of their own writings. Philo the Jew makes the self-confession that often his empty mind suddenly becomes full, as if the thoughts had snowed from heaven, a divine frenzy possesses him, while he becomes unconscious of self and his environment, etc. A modern example of the inspiration-illusion is that of persons who believe that the automatic acts performed by them, such as automatic writing and drawing, and explicit mental impressions, are the acts and messages of disembodied spirits. A lady well known to the author for many years, was of the intellectual type. Yet after the death of one of her daughters, she developed the power of automatic acts, and had mental impressions in the form of messages, all of which she firmly believed to be from her deceased daughter, or others known to be dead.

Will and Subconscious Activity. In like manner there seems to be a blind element in our volitions. Though we grant that much the larger part of our voluntary life is shaped from motive for some reason or the realization of some ulterior end, on the other hand, some acts are willed, we know not why, except that we are constrained by an inner force or impulse. We will to do so and so because—we *will,* or simply *because.* The child's *because* is also the man's reason for many volitions; oftentimes it is the deepest and most hearty reason. Our whims and notions are the will emanating from unconscious depths. Our impulses and instincts, constituting such an essential and large part of life, appear as, or rather *are* the will acting blindly. The *thoughtful* man strives to bring his whole life under reason; he, therefore, habitually questions his motives. Thales taught, "Know thyself." How difficult it is to know ourselves is especially apparent as regards our acts. We either can find no motive at all, or else we discover that the real motive is not the one uppermost in thought. We think, e. g., that we are acting unselfishly—we are usually ready to believe the best about ourselves—but impartial introspection may reveal that selfish considerations well masked and far back in the obscure corners of the mind, are the impelling motives. Where one or two reasons are assigned for an act, rigid analysis may disclose a multitude of them determining the will.

Dual Character. The same difficulty is frequently encountered in determining a man's character. There appear strange contradictions of life and he may exclaim as did Faust,

"Two souls, alas, dwell in my breast!"

It is probably the clearest statement of the case to say that man possesses a dual character: a superficial, acquired character, and a deeper and more original one of which even the possessor is not clearly conscious. Where character has been developed in line with the original one, as is generally more or less the case, no contradictions appear. Otherwise on occasion the duality manifests itself. We then say of such a person that his true nature has come to the surface. When a man is "in his cups" or has become insane, decided alterations in disposition and character appear—the honest shows himself as dishonest, the virtuous as sensual, the miser as generous or a spendthrift, the modest as bold and shameless, "not by the addition of any new ingredient to his nature," as Mercier puts it, "but by the uncovering and exposure of underlying qualities, which were always present in him, but which were overlaid, obscured, and suppressed by qualities of later acquisition." [1] No potion actually transforms a Dr. Jekyll into a Mr. Hyde.

Analogous are the irresistible impulses to commit theft, arson, murder, etc., even to the complete surprise of the subject himself, as is the case very frequently in insanity and other abnormal conditions. Contradictory elements in self may be demonstrated experimentally. Let us take the anæsthetic (completely insensible) hand of a hysterical patient, and let us cause it to trace the word "Paris" behind a screen. The consciousness of the patient knows nothing of this whatsoever. Thereupon addressing ourselves to the subject himself, we ask him to write "London." Eagerly he wishes to carry

[1] *Sanity and Insanity*, London, 1885, p. 332.

out our request, but to his utter astonishment the pen writes Paris instead of London.[1]

Unconscious Impressions. Of the innumerable stimuli from the objective world ever impinging upon the senses, we become aware of relatively few. The attention is fixed upon this and that sensation, while of the rest we are apparently as unconscious as if they were not existing, though we may assume that a far larger number of stimuli produce a definite impression than appear in consciousness. For in times of intense excitement, as in febrile delirium they may come in evidence. It may also be demonstrated by an experiment employed by a recent investigator, though to prove another proposition.

"On slips of paper I made a series of complicated drawings. Each had a different pattern. The subject had to look at the pattern of the drawing for ten seconds, and then the slip was withdrawn and he had to reproduce the drawing from memory—a task extremely difficult. It took him about fifteen seconds and more before he could make anything bearing the slightest resemblance to the drawing shown. When he finished the drawing, an elongated cardboard with eight digits pasted in a row was shown to him and the subject had to choose whichever digit he pleased. Now, on the margin of each slip was written a digit contained in the number of digits on the cardboard from which the subject had to choose. The subject, not having the slightest suspicion of the real purpose of the experiments, being *perfectly sure* that the whole matter was concerning imitation of the drawings . . . and being besides intensely absorbed in

[1] Binet, *On Double Consciousness.*

the contemplation and reproduction of the drawing, which was extremely complicated—the subject, I say, wholly disregarded the figure on the margin—he did not even notice it." Yet it made an impression, for the percentage of figures chosen corresponding to the drawing, was much higher than chance.[1]

The extensive experiments[2] on hysterical subjects, likewise show that sense-impressions that do not reach the "principal" consciousness, because they lack the necessary intensity, are taken note of by what has been called the "secondary consciousness." Two subjects that were observed, revealed in one-half of their bodies a total insensibility to punctures, pressure, burning,—in short, to the most varied kinds of painful sensations; but when a lighted match was placed into the anæsthetic hand, the fingers would draw back from the flame in proportion as the latter advanced, and would finally relax, allowing the match to fall to the ground. Apparently the pain was felt and the proper defensive movements performed, yet the principal consciousness knew nothing whatsoever of all this.

Deferred Impressions. Sometimes, too, impressions reaching the senses come to consciousness hours or days afterwards. A business man (as related to me) was asked a question while he was intently occupied with some one else. The questioner let the matter pass as it was of no great importance, but the next day on meeting the business man again, the former was surprised to receive the answer to the question of the day before without any apology. On inquiry it was learned that

[1] Sidis, *The Psychology of Suggestion*, New York, 1898, p. 172.
[2] By M. Binet.

the business man was quite unconscious of the fact that the question had been asked some twenty-odd hours before. Shakespeare gives us an illustration of this where the Prince, in *King Henry IV*, says: "I am not yet of Percy's mind, the Hotspur of the north; he that kills me some six or seven dozen of Scots at a breakfast, washes his hands, and says to his wife, 'Fie upon this quiet life! I want work.' 'O my sweet Harry,' says she, 'how many hast thou killed to-day?' 'Give my roan horse a drench,' says he; and answers, 'Some fourteen,' an hour after: 'a trifle, a trifle.' " [1]

Revivable Impressions in Unconscious Background. As impressions made upon the mind are revivable as memories, psychologists speak of the *retention* of impressions. While impressions are nowhere, in a sense, when they have passed out of consciousness, nevertheless there certainly is a difference between the impression that has passed beyond recall and the one which we may bring to mind at any time. The latter undoubtedly exists potentially somewhere, and that "place" must be the unconscious background of consciousness. Experiment in automatic writing with the planchette likewise reveals the fact that some things of which the subject is wholly ignorant (evidently because they could not be remembered) can be written down automatically—which is the proof that impressions exist even though we are not conscious of them.[2] A quite different proof, yet to the same effect, is furnished by hypnotism. What is said and done to a person in a deep hypnotic state, is generally not remembered by him, yet

[1] Pt. I, Act II, Scene IV, l. 100 ff.

[2] V. pp. 199–201.

if he be told to do something at a stated future time, after regaining his normal condition, he will carry out the instructions at the proper time and not know why he does so.

Habit and Unconscious Activity. An important and large part of man's training consists of learning how to do certain things with less consciousness and effort. All coördinated muscular movement, such as walking, reaching, etc., is at first accomplished by giving the strictest attention to the act. The same is true of the accomplishments that involve the intellect to a greater extent, such as reading, writing, computing, or playing a musical instrument. The laborious efforts of the beginner turn, however, into the swift, unerring, and more or less unconscious acts of the master. Habitual acts executed skillfully and easily always imply unconscious activity. The extent and complexity of the unconscious activity is instanced in the somnambule who may perform complicated and delicate acts while entirely unconscious.

Unconscious Causes of Mental States. Frequently we are baffled in our attempts to account for our feelings and convictions, just as we saw is sometimes the case in regard to the will. How often do we find our minds disturbed by we know not what! When the cause is persistently sought for, it sometimes presents itself as something forgotten, neglected, or done by or to us. Likewise we come to a conclusion or conviction before there is a distinct consciousness of the reasons. If it is felt that there are good reasons therefor, we call such a mental judgment an intuition;[1] if our judgment is felt

[1] V. p. 222.

as ungrounded, then it passes as a prejudice, or superstition. In any case, be it intuition, prejudice, or superstition, the judgment is the conscious outcome of causes not found in consciousness. That unconscious processes, like comparing, selecting, and reasoning, occur somewhere is not to be doubted; for persons have been known to work out difficult problems while soundly asleep. Then, too, it is a common occurrence that various intricate problems come up which we are unable to dispose of; we first have need to dismiss them and "sleep on them," as the expression goes, then to find, when we recall the matter, all clear and solved.

Minimum of Consciousness. Undoubtedly many reputed unconscious processes find their explanation in the fact that they are not wholly unconscious, as is supposed, but the minimum of consciousness. It is plain that the mind attends to one thing more than to another, and consequently has varying degrees of consciousness, of which the minimum is most readily forgotten. One has but to think of the evanescent nature of most dreams and many thoughts, which are forgotten almost as soon as they have occurred. However, this explains only those which are not truly unconscious processes, and we feel that even a superlative "minimum" of consciousness cannot apply to some cases. And, pray, how does a "minimum" that eludes detection even under the most rigorous search differ from absolute unconsciousness?

The Explanation. The simplest expression of the facts is physiological. The neurones, especially those of the central system, are so delicately constituted and subject to such complicated activity that there is never a moment that finds them in complete rest, but alterations

in chemical structure are taking place incessantly as synthetic and analytic processes, which, on account of their faintness, do not cross the threshold of consciousness. Some of these nerve-discharges, we may suppose, are stimulated by the continuous rhythm of vital functions; some are the uninhibited reverberations, so to speak, of previous states of consciousness, while still others must be looked upon as the spontaneous issue of brain-cell energy. That these activities follow the paths of inherited and acquired habits as well as be in line with the normal functioning of the brain during consciousness, is precisely what we should expect. Although these processes take place beneath the threshold of consciousness, now and then they seem to blend with other processes to modify them, or suddenly acquire threshold value.

Value of Consciousness. Consciousness possesses for us supreme value. Dear as life is to the average man, no one would hesitate to pronounce it worse than worthless, were it not for consciousness. We love and cling to life because it means a consciousness of life with its many varied relations and experiences. All our interests lie in consciousness, and without it, life and the world would in every sense lose their meaning. Men of all times have emphasized the worth of consciousness, be it under the name of mind, spirit, soul, or life. No wonder, then, that an immortal life has been the devoutest hope of mankind.

Significance of the Subconscious. Yet this consciousness, so central in our interests, is but a fraction of that which constitutes the man and his complete life. We believe that the emphasis put on consciousness, as is

done by the Cartesians,[1] is one-sided and misleading. For the conscious life is preceded by an unconscious state from which it emanates by degrees, and then continues, not on a dead level, but having interruptions and lulls as well as ebbs and floods. Potent agencies in its course are the stimuli from the outside world, on the one hand, and the subconscious influences and activities, on the other. The mind, then, works and manifests itself in accordance with definite laws, which, for the most part, never come into the clear light of consciousness. The conscious life is an expression of the man, yet its depths lie deep in an unconscious substratum.

Although much emphasis is laid on what man can make of himself, and rightly so, yet that which is of our making must be done wittingly and with purpose. Consciousness is more of an index of the person than a factor that directly shapes character in its depths. Our many impulses and instincts, often but dimly seen and understood, uniting with acquired habit as a mighty undercurrent, bear us on to the fulfillment of life's purposes.

Consciousness a Positive Factor. While we have deemed it necessary in this chapter to point out rather fully the extent and importance of the subconscious

[1] "But neither in the heavens above nor in the earth beneath nor in the waters that are under the earth, nor in consciousness,—whether regarded as envisagement or postulate or inference,—'lies' any such Ego as this (an elusive, unknown, and unknowable Ego). And if it were existent and could be cornered and caught in spite of its attempts to 'elude cognition,' it would be an absolutely worthless 'catch' at the best. For it is only the Ego that, instead of 'eluding cognition,' is actually present in every act of self-consciousness, self-knowing and self-known, which has any claim to existence, or to worth of existence in case it validates its claim."—Ladd, *Philosophy of Mind*, New York, 1895 p. 163 ff.

elements and acts, it is not to be forgotten, on the other hand, that consciousness reaches down into the subconscious forces and character of man. Every thought and emotion and conscious act leaves its record upon the mind. We have already seen how mental discipline leaves even its visible marks upon the brain in an increase of cortical substance.[1] Our conscious acts repeated tend to become habit, and habit may be transmitted by heredity to the offspring as instinct, which, in turn as an unconscious factor, is subject to the influences of the conscious life. In other words, consciousness is not a superfluous element—an epi-phenomenon, as Huxley has termed it—in the real life of man. The mental man, on the one hand, is not merely an intricate mechanism, capable of adaptation to its environment, and in addition, of putting forth a wonderful evanescent product called consciousness, which has no more significance than the shadow of the human frame. Nor, on the other hand, is the mental man simply a consciousness that can be understood in and by itself. Psychology must admit a variety of facts and phenomena for consideration, if mind is to be understood as one of the factors of life.

[1] P. 33.

CHAPTER IV

WILL

Activity—Will. A prominent feature of the life of man is its activity. There are the brain, the sense-organs, and numerous muscles in various parts of the body, and all these are active from the beginning in one way or other. At first the mental activity—such as it is—and the bodily movements are spontaneous and reflexive, and are to no conscious purpose. Even the movements that serve a definite end, such as sucking, crying, biting, attending to sense-stimuli, are reflexive with the child; that is, they are unconsciously produced by the mechanism of the nervous system. But after a while, these various spontaneous and automatic activities gradually become a part of the conscious experience, and then are regulated and controlled in a manner that is called voluntary. An act that is performed without consciousness is never felt to be voluntary. In order that an act may be regarded as voluntary, it must be performed with consciousness.

Consciousness and Will. But it does not follow, as is held by the so-called *voluntarists*, that consciousness in itself is invariably voluntaristic, i. e., possesses that particular quality or characteristic that we note in voluntary acts. By referring directly to consciousness, we find there passive states of consciousness as well as those expressive of will; and in the delirium of a fever ideas

and images course through the mind wildly and uncontrolled, and the subject of them feels utterly impotent to check or abolish them. It would hardly be proper to ascribe volition to consciousness of this kind. In other words, volition, or will, is not to be thought of as consciousness, in spite of the fact that we recognize no act as voluntary unless it somehow springs out of consciousness.

Varieties of Will. Will manifests itself variously. It exercises control over consciousness itself and the sense-organs as *attention;* over ideas and their relation as *thought;* and over the voluntary muscles as *kinetic will.* The master of self has control in all these ways, and his development from impotent infancy has been along these lines. Primitive consciousness is diffused and indistinct, and a regulating act is implied in bringing original diffused consciousness, such as we infer is found in the infant, to some definiteness and clearness. Clear consciousness undoubtedly implies a form of original attention.

Involuntary Attention. So also the power to attend to, or to dwell upon, any sensation, image, or ideal is a matter of gradual development and is parallel with the development of consciousness—from consciousness as sensation to that of consciousness as thought. The child begins by involuntarily attending to the sensations arising in it through different stimuli. As the sense-organs, such as the eyes and ears, involuntarily accommodate themselves so as better to receive the stimuli of light and sound, so the mind directs itself to some particular sensations in order fully to realize them. The eye turns to the brightest light as spontaneously as the

growing plant does. The ear accommodates itself internally to the strongest or most characteristic sound as the weathervane turns to the wind. So the brain has the power to suppress a portion of its excitations and maintain another part which relates to the exciting cause; and so a particular mental function responds to the stimulus—in other words, the stimulus arouses attention, which then is *perceiving* consciousness (perception).

Selective Will. As yet attention is only spontaneous and hence involuntary. But when the mind selects or attends to this rather than that, not because the thing compels attention through its attractiveness, but because of choice for either immediate or remote purpose, then it is voluntary attention, or selective will. At this stage of development we may take the matter that is ordinarily least attractive, into the limited field of clear consciousness (narrowness of consciousness) and neglect all the rest.

Selective Will in Thinking. It is in *thinking* eminently that the selective will is active. Whenever the mind is in a waking state, a multitude of images and ideas come and go according to the natural course of association. One thing or idea suggests another *ad infinitum*. They come uncalled and they lead to no end. When, however, active attention holds this and that idea before consciousness, thereby dismissing the rest, because the former are needed to reach some definite conclusion, then we have *thought*.

Kinetic Will. It is also a gradual process extending over many years of repeated trials to control hands, arms, feet, legs, eyes, tongue, vocal organs, etc., for only the

commonest of the great variety of possible movements. How imperfect our control is, even after years of life, may be seen in the futile efforts that we make to draw a perfectly straight line or a perfect circle off-hand.

Development of Will. Getting control, then, of the formerly uncontrolled movements, learning to select and hold in consciousness any image, idea, or sensation brought there by chance, association, or previous volition, constitutes the development of the human will. Growth or decline of these powers gives us the consciousness of the growth and decline of the will. It then follows, that he who has never checked or guided an impulse and movement, and has never engaged in thinking—that such a one has not had the first experience of will.

Control of Voluntary Muscles. The full development of the regulative power means that we are able to exercise direct control over our so-called voluntary muscles, and so produce and restrain movements of the body. The hands, feet, head, eyes, tongue, etc., can be directed by the will. In fact, the distinction between voluntary and involuntary muscles is only relative. For some persons can directly control so-called involuntary muscles. Thus the physiologist E. F. Weber could at will stop the action of his heart, and Fontana could produce contraction of the iris. Indirectly we can produce change in other parts of the body by holding before our mind the appropriate idea. Our "imaginary" ills and pains often become real in time; and our physical well-being is quite as often the result of persistent declarations that all is well; or we may even produce change in the body of another person by sug-

gestion, best illustrated by hypnotism. This matter will be treated in another chapter.

Direction of Consciousness: Attention and Thinking. We also feel that we direct our thoughts; we hold before consciousness sensations and ideas; we restrain impertinent and unallowable associations; we bring to memory past experiences; make new combinations of ideas, and frame new resolutions; approve and condemn, compare and weigh, select and dismiss.

Will Defined. This we call *will*—the power of directing or restraining our activities to the extent that we feel ourselves the actors, and not merely passive spectators of our conscious, changing mind and body,—the *whole mind active,* as Angell has tersely put it.[1]

Will Analyzed: 1. Idea. We have already stated that before there can be voluntary acts there must be a consciousness of the acts, or ideas as objects for the will to realize. An act that does not follow an idea, whether it serves a purpose or not, can in no sense be called voluntary, inasmuch as it has no place in consciousness. Such an act may be merely reflexive, and in no way express the will of the person. In other words, before one can will to do something he must know what he wishes to do, or represent to himself the act. It is quite evident that the idea or representation may be very vague, indefinite, and lacking in details; or it may be vivid and complete. For example, I may have the idea, *write—earth.* Or I may not only have before me the idea of writing the word *earth,* but also a definite representation of the exact appearance of the word and of the movements of the hand and arm that have to be performed in writing the word.

[1] *Psychology,* New York, 1908, p. 397.

In either case the ideas are sufficient for the purpose of voluntary action. Yet it is plain that the clearer and more specific the representation, the more properly can the act be designated as voluntary. In other words, there are degrees of voluntariness. In writing these words page after page, I think merely the words, while the spelling of them and formation of the letters are almost entirely automatic. In the common daily acts and routine we employ a sort of mental shorthand, or conscious initiative, while the details of the acts are automatically executed. In exceptional and extreme cases, a voluntary act may be performed with an admixture of a long and complicated series of automatic acts. For example, a friend, who helped in the rescue of two drowning bathers, says that he was dressing when the cry of distress reached his ears. He rushed out half clad, leaped over a creek in a gully, made his way over snags and through underbrush and over a barbed wire fence into the river with no thought in his mind but to reach the drowning persons. How he reached them he did not have the faintest idea, except by inference. The rescue was voluntary, but the details were automatically performed.

2. Correlation of Idea and Muscles. Again, it was seen that before one can perform an act expressed in bodily movements, control of the muscles must be gained. The question now arises, even though one has the idea of a physical movement, how is it possible to affect the proper nerve and muscle and carry out the act? I may wish, e. g., to bend the right index finger; what is the cue that enables me to perform the act? Our answer is, there must be found or established a path

of discharge from the centers of thought to the appropriate motor centers. The finding or establishing of such a path does not occur voluntarily, but is a matter of development, extending through months and years of the earlier part of life. It is then that a multitude of reflexive, impulsive movements take place, bringing nearly every muscle and joint of the body into use. Each movement yields its peculiar (kinesthetic) sensations that are registered upon the brain and by degrees originate the *idea* of the movement. Hence the association of a movement and the consequent idea of a movement is most intimate. If now we start with the idea of a movement, it should not be so much a difficulty to see how it resolves itself into movement as how it should not. For the idea of a movement possesses motor impulse, and thus tends to express itself in a movement. It is in this intimate relationship, then, between a particular ideational state and a physical change established during months and years of experience, that we are to look for the cue to every voluntary movement. Indeed, the cue to our movements *is* the immediate correlation established through experience; for neither introspection nor any examination reveals anything else in us through which the inner self is enabled to inaugurate change—the key, as it were, through which the idea may get at the appropriate bodily parts.

3. Consent or Inhibition. But, if we are to trust our own consciousness about the matter, there is more to volition, or will, than a mere idea of an act and the resultant change. I may, e. g., have the idea of moving a finger, and have the movement. Yet this does not indicate will. The essential thing in willing is that state

or moment of self, which precedes every voluntary act that may be expressed by the command to one's self, "Now act!" or "Now let the idea be realized!" Any act, although preceded by the idea, yet not receiving the sanction or *consent* of the self, is disclaimed and foreign to the will. In any physical or mental act, that which constitutes it an act of will is the mental process that either consents to have the idea realized or inhibited (checked), or *makes up* the content of consciousness through selection. According to some psychologists, the fundamental element in volition is inhibition, or checking of some activities, but permitting other tendencies or impulses, either physical or ideational, to resolve themselves into acts. Consent is, according to this view, only the absence of an inhibition. But be this as it may, the result is the same as a positive sanction of an act.

4. Motive. It may be asked why we consent to any particular idea, or to do this rather than something else. This is the inquiry after the motive of action. Has every voluntary act a motive, and what is a motive?

If an act be analyzed, it will appear that besides the more or less distinct idea and preëminently active aspect of consciousness, there is also present at the same time an emotion. And as we perceive these mental aspects standing in definite relation to one another—each idea calling up its own emotion or *vice versa*—and standing also in relation to the act, which follows the idea and its peculiar emotional aspect, they are called the motive of an act. As a voluntary act invariably implies a particular antecedent condition of the mind

that we have described as the motive, it is tautological to add that no voluntary act takes place without a motive.

Motive not Apart from Act. But it is not to be thought that the motive, although antecedent, is, in any sense, apart from the act of will, any more than the electric tension in the cloud is apart from the discharge as a thunderbolt. Before acting we often deliberate; we marshal various ideas, and test and weigh them, but usually, sooner or later, some one idea comes up or gains a potency that determines the outcome. Whether or not that idea derives its force from its suitableness to our nature, or because it has been discovered to accord with some principle, or expresses a concept of wider application and greater satisfaction, it does possess in every case a potency, an emotional efficiency that enlists the mind to act.

Motives the Spontaneous Output of Mind. Since by the logic of things, motives determine the act—the kind and extent—and since motives are not produced *ex nihilo* by the person, but are the impelling element of the mind springing from its very being, it follows that every voluntary act is the expression of the actor's nature. A person does not transcend himself—the potential, ultimate self—in either feeling, thought, or conduct. Any act of will has for its antecedent all of the person's previous life experiences, as well as his inherited qualities. A person's likes and dislikes are the product of his birth and past training and experiences. His desires spring up spontaneously, and his thinking is largely determined by the laws of thought. As it is impossible to will away any of these elements, they must necessarily enter into vol-

untary acts; that is, they must, within certain limits, determine the will.

Freedom of Will. It now remains to point out briefly, from a psychological view, in what sense the common conviction is true that will is free. The testimony of consciousness is that we are not mechanisms, in which the principle of causality forms the nexus as in the physical world, but are the makers of our characters to the extent that we are responsible for our conduct.

Freedom Defined. The above analysis does not disprove freedom, but it shows, I think, that a will acting arbitrarily and irrespectively of the nature of the mind and its experiences, is a mythical product and not a human will. If by freedom is meant the ability to act without any principle and reference to other facts, as though the will had no relation to anything in the world, then there is no freedom. But if by freedom is meant the power consciously to have self-movement within natural limits to the extent that we feel ourselves the actors and not merely passive spectators of our conscious, changing mind and body, then the term *free* can be applied to the will.

Limits of Freedom. The natural limits within which freedom manifests itself are the ideas, emotions, and impulses, which arise spontaneously in the mind according to its nature and its experiences. Though all of them are the product of the mind, it does not accord them all the same attention, but dismisses some and holds others for its own realization. By dwelling upon an idea, we know not why,[1] and thereby giving opportunity for the appropriate emotion to arise, the mind may be said to

[1] That is, the choice seems blind and motiveless. Cf. pp. 61, 112.

elect its motive. The election occurs from among a limited number of motives possible for the mind to put forth and in accordance with its own interests. Thus the will acts according to its own nature. So it can be said that, because mind is what it is and has some rational insight into its own nature and its essential relations in the world, it forms its own motives without any compulsion but its own nature. At every point of the conscious life there seems to reside an inherent power that throws emphasis upon this or that element of consciousness through selective attention; it dismisses, represses, and checks other elements through the power of inhibition. To deny this power of attention and inhibition would be to deny a plain fact of consciousness. For nothing is more certain in introspection than that we can repress emotions and check impulses; in other words, that we are not automatons, ever expressing with inflexible necessity every idea, emotion, and impulse that comes to consciousness, but before we act we may deliberate what is to be done. There are thus brought before the mind various interests, personal desires, prudence and duty, and ideas of various actions or courses of conduct, and from them we choose that which commends itself to the deliberating mind. It is from this broader outlook, which we have during deliberation, that we may get still other ideas and ideals, and so ever enlarge our outlook. Thus, while we are not able to transcend our characters—i. e., our potential and not actual characters—at any one moment, we are able, because of the very nature of consciousness, which is to know, to deliberate, to form larger and higher concepts—to reach out after, grasp and appropriate, as it were, the

very thoughts and ideals, which were revealed to us the moment before through deliberation. Thus every step of conduct is natural yet not necessitated. Each step is a self-expression, and yet, so to speak, it adds to self. By a series of self-expressions, in which the whole personality is the immediate antecedent of choice, character can be considerably modified. While the mind is restricted and limited by its own nature, it is eminently free to give expression to itself. Man, because he has consciousness and the power of deliberation, is like a spectator in a high tower looking about on a large horizon. He can concentrate his attention on any portion of it, and neglect the rest. Or his thought is as tendrils that he can put forth and fasten on objects to draw these in or to draw himself up to the objects. Or again, as he is provided with means of locomotion, enabling him to carry himself far beyond where nature has placed him, so he also has mind by which he can get away and beyond his original character, or nature. And this is all the freedom that can be expected and that is desirable. New purposes in life may be gained; tastes diametrically opposed to the old ones may be formed; and new principles acquired to dominate our conduct. It is because of these convictions deeply ingrained in our very being, that we have an ineradicable sense of moral responsibility.

Determinism. It is not necessary here to state the arguments for determinism of the will. This, however, is essentially the view of determinists:

The will is not free, for that would be caprice, a disturbing element in the universe. But cause and effect alike apply to will. The will acts according to motive,

and motive is the effect of causes, viz., the nature, education, and experience of the individual. With such precision does the will act, that scientists figure out the number of suicides, births, etc., that will occur in a future year. Even manufacturers can estimate the future demand for any article, and by that gauge the output of the commodity. The will, in fact, is not a cause but an effect, a passive accompaniment of physical changes. The will, like consciousness in general, does not produce but testifies to the existence of a condition.

Spheres of Interest. The expression of the will is thought, action, conduct. As the conscious life is a continuity, as well as the physical life, the acts of will are not isolated or unrelated in their bearings, but usually have reference to some sphere of interests. Each voluntary act has its immediate motive, which in turn may be subordinate to some general or ulterior motive. The farmer plows the ground in order to loosen the soil, in order that the seed may grow, in order that he may have something to live on, etc. In other words, the will acts invariably from motive and usually also for some *reason,* or remoter motive. We say acts *usually* for some reason; for, as stated in a previous chapter, some acts are performed for no discoverable motive beyond their own immediate realization, and furnish an illustration of the will acting blindly, though not in the sense of Schopenhauer, viz., unconsciously.

Supreme Motive. The spheres of interests, or reasons or remoter motives, with reference to which the rational acts are performed, constitute, as it were, the springs of action. Of these there may be many, but the will attaches special importance to one or the other according

to the circumstances; i. e., the various springs of action may be subordinate or subject to one that is supreme to all others, and not in a fixed hierarchy, as Dr. Martineau maintained in his *Types of Ethical Theory.* To be sure, there are persons that do not seem to be possessed of a supreme motive, but are controlled by various ulterior motives natural to them, without one or the other ever gaining supremacy. In other words, some men have no defined principles of conduct. Their acts are to appease hunger, keep clothed and housed, maintain a certain position in the social world, to be free from sickness and pain, and the like. Though these motives are instinctive, in a sense, and fundamental, they are brought under a supreme spring of action more or less completely by the man that is usually of a serious, thoughtful turn of mind. What this supreme motive, or principle may be, depends on temperament, education, and experience. With one it is *virtue* (Stoics), with another *pleasure* (Epicurus), or the *categorical imperative* (Kant), which expresses itself in Thou shalt or shalt not, or *utility* (J. S. Mill) for the individual and the race.

Means Made the End. It occurs also as the exception that a person's supreme ambition is the attainment of some thing that is usually regarded as a means to an end, and not an end in itself. Thus one is controlled by his thirst for money, and not for that which money will buy (miser); or for the discovery of new facts, and not for what value these facts may have upon the great body of truth and their relation to man;[1] or he may make supreme the desire to be successful in what he has set before him even though it be nothing more than a game. The

[1] *Pragmatism* is a recent philosophical protest against this attitude.

scholar's attitude is well expressed in what Lessing says of himself: "If God held all truth in His right hand, and in His left only the everliving impulse for truth; if He said to me, 'Choose,' I should, even though with the condition that I should remain forever in error, with humility incline towards His left, and say, 'Father, give; pure truth is for Thee alone.' " [1]

Physical Motives. It is during the period of infancy, both individual and racial, that the body is the chief concern. On the whole, it is a sensuous life; the principal enjoyments and solicitude are those of the senses; and the only motives are those that concern the senses. Physical punishment and threats, promises of that which gives pleasure to the senses, are the means of correction and inducements for any desired course. Might makes right among primitive races, and not considerations of the fitness of things. The ideals before them are physical strength and boldness, material possessions, and "length of days" in which to enjoy life.

Social Motives. But no person is a pure egoist. Man is a social being. His life is among others, each one of whose claims must be considered to some extent. He craves the company of others, and courts their approval and applause. In most men the social instinct is so strong that deprivation of the company of others and their good will is well-nigh unendurable. So to the extent that a person has social needs, so far is he willing to yield a portion of his physical comforts, pleasure, and concerns, in order to attain the good will and recognition of others.

The most pronounced social attitude is noticed in the

[1] *Eine Duplik.*

family. There is here not only the physical relation but a corresponding mental affinity, affection, and aspiration. Next comes the social attachment to friends and acquaintances, the community in which one lives, his country, men of his race, and finally for the human race in the widest sense of the word.

Spiritual Motives. Furthermore, at a certain stage of development, man feels that his real being is that "part" of him that thinks, feels, determines, etc. It is the stage when man perceives and values mind above all other things, and he feels that the soul is the man. Coördinate with this consciousness comes an appreciation of mental development for its own sake. A supreme regard is had for power of the intellect, for the states of mind that determine the conduct of the individual, and for the affective aspect of consciousness as such. The spirit is more highly valued than life; the motive is placed above the outer act; the tastes, ideals, and attitude of the mind—the treasures in heaven—above material possessions—the treasures upon earth, etc.

This aspect of man, which finds supreme satisfaction in the existence and development of mental qualities, may be called the spiritual, or the inner man. It asserts itself in efforts in education and in the advancement of a broader culture. It shows itself in its emphasis of true rationality, or ideality. Civilized man knows nothing higher than duty—and one's duties are his ideals, which he feels ought to prevail. From this springs the faith in a Supreme Being, in whom man seeks to realize the highest possible ideals and to whom imperfect man approaches to worship Perfection, and to draw inspiration for his spiritual self. It is the spiritual self in devotion to the

Father of Spirits, that finds supreme satisfaction in the harmonizing and identifying of the actual self with the ideal.

Various Simultaneous Motives. While this is the order of the development of motives, it must not be forgotten that man simultaneously has many functions, instincts, and desires running out in different directions, and that these occur in every human being, but in varying proportions. No normal man is all animal, or all social, or all spiritual. To be sure, there are those that are chiefly physical or exceedingly social. Besides, history abounds in ascetics, who have striven to suppress the physical and social man.[1] But asceticism, as a philosophy and a practice, is foreign to this age.

What our acts or conduct should be, is for ethics, a science of values, to point out; yet psychology may examine and judge acts from a point of vigor, health, promptness, and persistency.

Irresolution. As already seen, the will manifests itself in attention, thought, and muscular movement or in repression of movement (inhibition). *Irresolution* is a mental state in which volition is, for the time being, deferred. It is probably due to an equal distribution of feeling with regard to several ideas. Various courses of action or ends present themselves, but until some one of them develops a preponderance of emotion, volition remains suspended. Who has not, at times, found himself pondering over a trifling matter an undue length of time, and unable to come to a decision, when *any* decision would serve the purpose? The contemplative, critical mind, that thinks before acting, is likely to be

[1] The absolutely unsocial man must be regarded as an anomaly.

irresolute until one of the many considerations called up gains sufficient emotional strength for a decision, or the will of another person supervenes. Irresolution implies more or less of a conflict of motives varying in intensity as the intensity of the motives. In the healthy mind the conflict sooner or later ends in favor of one of the ideas. A continued irresolution, however, is an indication of a pathological condition. Doubting mania, or Grübelsucht, e. g., is a condition where doubting and hesitation continue constantly. At first the patient is merely afflicted with endless questions about the commonest acts, then comes greater uncertainty regarding his acts, and finally fear and perplexity render him almost inactive in certain lines. "Such was the cathedral beadle mentioned by Morel, who, worried for twenty-five years by absurd fears, no longer dares to touch his halberd, reasons with himself, and triumphs over himself, but by a sacrifice that he is apprehensive of being unable to make the next time." [1]

Suspension or Enfeeblement of Will. *Suspension or enfeeblement* of will is no uncommon occurrence. This has been described as a paralysis of the will. Mentally the condition is felt as a fear. There are persons afflicted with fear for places and spaces,[2] of which they are powerless to rid themselves. The case of O. G., living on a farm just outside of a small Iowa town, interestingly illustrates just such a disturbance of the will, as well as of the emotions. For many years he has not been able to force himself to go over the hill into town, until recently, and even now, in his thirty-seventh year,

[1] Ribot, *The Diseases of the Will.*

[2] Unscientifically called Agoraphobia.

he at no time feels free to go anywhere he wishes. "I can hardly accurately describe," he writes to me, "the peculiar and unpleasant sensations that I have to endure. When I get very far from home, a peculiar and dreadful fear seems to come over me, my face seems to flush, like the blood was rushing to my head, and I feel as if I would die or lose consciousness. I usually start on a run at such times, and when it passes off I am usually very weak for a while. It is a terrible sensation. It seems to be more than ordinary fear: it seems to overpower me physically and mentally. . . . I go to town now with my father, but do not feel easy. . . . I don't see as there is anything about the town, hill, or people, that causes me to fear them; it is simply something I cannot explain, and it seems about as foolish to me as to other people. My reason condemns it, but nevertheless I can't free myself from the thoughts and fears caused by it." In a subsequent letter he writes: "I felt much more secure and confident when walking near a fence or building." A patient of Professor Flechsig's known to the writer, was with difficulty induced to walk even with assistance, because she was afraid. Every step taken was with lamentation and expressions of fear. The loss of attentive power occurs usually with loss of strength and health. The person may make desperate efforts to read a page, but finds it utterly impossible to hold the attention so as to get the meaning.

Aboulia. Another kind of volitional disturbance is *aboulia,* an abnormal condition in which the patient *wills,* but the movement does not follow, to his own astonishment. If left to himself, he may pass entire days wherever he happens to be, in bed or on a chair.

The case of a man is reported,[1] who was thus afflicted, yet was mentally sound in all other respects. Sometimes it took him two hours to undress. On one occasion he kept a servant standing before him for half an hour before he was able to take a glass of water that he had ordered. At such times it seemed to him "as if another person had taken possession of his will."

The fact that in aboulia there is *willing* but difficult or no action, is to be ascribed either to the feebleness of the motor impulse, which converts, so to speak, the volition into movement, or to the loss of the local sign, or cue to the particular act, or to a temporary partial paralysis of the motor region of the brain.

This kind of a will has been called the obstructed will, and is typified in the normal man, who lives largely in the realm of thought and ideals, who considers consequences carefully, and though convinced that the world is out of joint, yet despairs of ever setting it aright. It is here that the conservative belongs, who does not love the old, but is incapable of deciding for the new; the genius of vast projects but of few deeds; the degenerate sinner that understands his situation, but seems incapable of abandoning his cup and debauchery, etc.

Explosive Will. The other extreme, though normal type, is the explosive will, as it has been called, and is marked by quick, decisive action, due to lack of inhibition, or to the extraordinary intensity of motor impulse. Those having this kind of a will do not sit in lengthy councils, but strike the blow. Easily aroused and hot-headed, they are the first to be enlisted in any movement

[1] By Dr. J. H. Bennett.

or cause, but also the first to be turned aside from their course.

Lack of Inhibition. Lack of inhibition, or extraordinary motor impulse may occur in an abnormal degree. The person that in a flash of anger strikes before realizing the act, we say, lost self-control, and is not unusual. Yet it is abnormal, when a woman, as related by a French writer, in a state of sadness, suddenly rises from a garden-bench and throws herself into a ditch full of water, but afterwards has no recollection of either the purpose or the deed.[1] All sorts of unnatural impulses take possession of men: to kill self and others (suicidal and homicidal mania), to steal (kleptomania), to burn (pyromania), to mimic spoken words (echolalia), etc. Often the mind has just sufficient repressive power to check an impulse, but not enough to banish it from the mind, in which case it may linger for days and years.

Summary. We see, then, that a sound will depends on several distinguishable elements that must sustain a definite relation and proportion to each other. The impulse must be of sufficient strength: neither too great nor too weak. It must somehow have yielded its cue to consciousness, and be correlated with an idea, which must come and be able to arouse the appropriate emotion, as the conditions of life demand. And lastly, there must be the power of the mind to throw itself, as it were, upon any idea or to embrace it in order to express and realize it in act; or, on the other hand, to inhibit and suppress any part of the mental content. In the last analysis any will that is not able to say effectively, *I will* so and so, cannot well be placed in the normal list.

[1] V. Ribot, op. cit.

CHAPTER V

HABITUATION

Law of Habituation. In the last chapter we considered the active aspect of life, which, when accompanied by consciousness and expressing it more or less completely, constitutes the will. In this chapter attention is called to the tendency of acts to become mechanized as habits. This tendency is habituation, and its law is that when an act is once performed it is more readily accomplished a second time, and the next time more readily than the second, etc., until the act becomes automatic or is felt as necessary, that is, until the habit is formed.

Physical Law and Habit Contrasted. The difference between physical law and habit is to be noted carefully at the outset, especially since a number of psychologists have endeavored to identify them. In a sense habit is to nervous organization what physical law is to matter at large: both indicate the behavior of the organization and matter. But the great difference between habit and physical law lies not so much in their operation as in their history. The physical laws are not a development so far as we know, but are conceived as eternal properties of matter. There has not been a time when, e. g., under the same conditions Saturn would not revolve about the sun; or when two parts of hydrogen would not unite with one of oxygen to form water; or when water would not run down hill just as readily as now. It makes no

difference how many times the ball is tossed into the air, it will not go up or come down more easily after the millionth toss than before the first. Habit, on the other hand, implies a formative process, which is habituation, besides the final disposition to act in a certain way.

Growth of Habits. Habituation is a fundamental character of nerve-substance, lying in its plasticity. In a sense, it is a sort of memory, which applies to all nervous discharge. A partial or general discharge in the nervous system tends to recur, no matter what organs or muscles it may affect; and when it does recur, it may be quite automatic. We begin with but little ability to accomplish definite ends. At first bodily movements are performed with difficulty, although they be ever so simple. But sooner or later, according to their complexity and kind, they are executed with little effort, or quite automatically. Muscular tissue at first responds but feebly to excitations, but gains in vigor with every successive stimulation, until the maximum vigor is reached. The new-born child has to gain not only contractile power of the muscles, but also coördination of muscular movements to some purpose. At first there is a general response to excitation, whatever its nature. Light striking the eyes of the new-born child, produces incoherent movements, not only of the eyes, but to some extent of the whole body. But after many responses to stimulations and spontaneous efforts in movements of the various muscles, the child comes into possession of the power to coördinate. He learns to turn his eyes upon the proper objects, to use arms and hands, to walk, etc. Repeated attempts, all successful to some extent, have not only given the "cue" to motor control, but have also con-

served in the nervous substance a tendency to respond in the same way again. Thus all acquired reflex action is nervous habit.

Mental Habits. In like manner the activities of the mind tend to become habitual in various directions; in fact it is hard to conceive of extensive mental development without habituation. What the mind does, perceives and conceives, associates and imagines, is to some extent determined by habit. The milkman's horse making the daily rounds, becomes perfectly accustomed to the route, and consequently turns in at the right place and stops at the proper gate. The man himself performs a large portion of his routine work with as little thought as his horse. How often, when absorbed in thought and asked to do some chore, do we perform some other customary act! The boy is requested to bring in an armful of wood, and perhaps he starts off in the opposite direction for the well with the water-pail, and possibly does not discover his mistake until he has nearly performed the unintentional task.

It will be seen later that the laws of association are a species of habit, viz., that what has been in the mind once tends to occur together again. We can scarcely think of a familiar house without having also appear in consciousness a more or less distinct image of the people living in the house. The kind of mental imagery employed in our thinking is largely determined by habit, as will be shown more fully later.

Our concepts and their use follow the line of habit. Every experience we tend to bring under the familiar concepts, and after a time it is almost impossible to conceive things in any other than the habitual way. There-

fore we may say that the mind ever tends to form for itself channels or grooves of behavior. Early in the history of science, when philosophers attempted to explain the ultimate nature of mind, they conceived it as a sort of refined or attenuated matter. Later, mind was thought to be secretion of the brain. So also electricity was long conceived as a sort of a mysterious fluid, and even now we speak of the electric current.

Perception is based upon past experience, and is a reproduction of sense-images on the occasion of experiencing one or more of a group of possible sensations previously experienced together. The orange on the table is seen, not merely as a colored disk, but there come also impressions of the spherical shape and the other side not seen at all, and weight, taste, and odor; i. e., together with the visual sensation there come also images of the orange as it feels in the hand and mouth, and near the nostrils.

Habituation General. Habituation, then, being a fundamental property of nerve-cells, is the basis of countless habits affecting probably every bodily and mental movement or act. Habits are observable in the peculiarities and mannerisms of a person as he walks and talks, feels and thinks; in the way he pulls out his watch, eats, and attends to his work, as well as in the more significant moral acts of sobriety, honesty, application, truthfulness, self-denial, benevolence, or their opposites.

Repetition and Habit. Definite habits are formed by repeated acts. Before the habit of orderliness becomes established, many acts are performed—in fact every occasion calling for action of this kind is used. The honest man is so by a life of honesty. The liar has formed the

characteristic habit by repeated inattention to truth and accuracy.

Power of Habit. During the more impressionable years of one's life, habituation is most potent. The habits then formed become, as it were, his "second nature." In fact it may be that, as Wellington has said, "Habit is ten times nature." This is impressively depicted by Victor Hugo in Javert, a character in *Les Misérables*. Javert was an officer of the law, and all his life he had undeviatingly carried out the requirements of the letter of the law. His moral horizon was bounded by the code, and the chief of police was, in a sense, his God. When, however, Javert came face to face with Jean Valjean, an escaped galley-slave, who came under the ban of the law, yet whom Javert recognized as a sacred being nearer angel than man, he realized, apparently for the first time in his life, that there was a law higher than the police-law and an authority superior to the chief of police. Yet Javert could not accommodate himself to this new insight, because there was that undeviating habit of unflinching obedience to the police-law. His only escape from the dilemma he found in suicide.

Habits may be Changed. Habits are hard to change. The tippler feels that he cannot leave his debauching cups, and the smoker that he cannot do without his pipe. Yet habituation does not apply alone to the early years, but extends throughout life. That means old habits may be modified or abandoned, and new ones may be formed to take their place. The propensity of even mature persons "to fall into bad ways," as the saying goes, is a well-known fact. On the other hand, it is also often the

case that persons improve with age by abandoning the bad and cultivating more the good.

Best Method of Getting Rid of Old Habits. It may be asked how we can most effectively rid ourselves of well-established evil habits. Should it be done by degrees or by a supreme effort on our part? Undoubtedly the radical course immediately entered upon is the most effective. As repeated acts have formed the habit, so persistent inactivity along the habitual lines, backed by unswerving purpose, will weaken the tendency and may eventually overcome it altogether.

Rôle of Habituation. The rôle of habituation in the formation of character is a matter that parents and teachers cannot easily overestimate. From the start the child begins to form habits, not only those conducive to continued physical life, but also those suited to social, moral, and mental well-being. Moral character, which is the most valuable part of us, is a *habit of willing;* and when we say this, we have enunciated a fact acknowledged from the time of Aristotle down to be the most important pedagogical truth there is. It is for all those interested in the proper training and education of the young to apply this principle to the various activities of those entrusted to them. Habituation in the scheme of education as well as in pedagogics, needs a more prominent place than it is receiving at the present time.

The importance of habits to the race, when transmitted by heredity, will be considered in another chapter.

CHAPTER VI

HEREDITY

Heredity a Common Fact. Hereditary transmission of physical characters from parent to offspring is one of the plain facts of common experience. The plant and tree as well as the various forms of animal life reproduce themselves in their descendants generation after generation. The general characteristics, e. g., of the oak of today, were the characteristics of that species a thousand years ago. The general physical and mental traits of the modern man were found in man before the dawn of history.

Yet not only are the more palpable and essential characters transmitted by heredity, but also those more subtle and incidental. Where there has been no intermixture of the racial divisions of the human family, the characteristics of each race are transmitted from generation to generation with little variation. Even within any one race, we find more or less definite national traits that cling to the individual of that nation under diverse circumstances and environments. This is especially true in communities and among peoples where intermarriage within a limited number of families has prevailed for many generations. It is this fact that accounts for the striking resemblance of one individual to another among the Semitic people, with respect to both body and mind. Furthermore, it is a fact of ex-

perience that trifling peculiarities, both physical and mental, such as birthmarks, expressions of face and speech, gestures and gait, the presence of extra digits, the tendency to synæsthesia, as explained in Chapter IX, as well as certain proclivities and tastes, are transmitted by heredity, as is evident from the fact that these peculiarities occur, even though sporadically, in certain families. In other words, it is heredity that acts for the preservation of types and races.

Hereditary Transmission of Mental Qualities and Tendencies. Before passing on, we should dwell a little on hereditary transmission of mental qualities and tendencies. Several eminent scientists, such as Galton and Ribot, have given the matter considerable attention. Galton has compiled lists of men of reputation, and grouped them into families, showing their blood-relationship. He has found that out of 286 English judges that were made the subjects of his inquiry, 109 of them have one or more relatives of eminence. In like manner, he has tabulated statesmen, commanders, literary men, men of science, poets, musicians, painters, etc. The conclusions drawn from every one of these lists show that the ablest men had the largest number of able relatives; and the nearer the kinship the greater the chance of inheriting ability.[1]

Illustrations. In illustration of hereditary transmission of mental characteristics, we may mention Richard Porson, a scholar and critic of Greek, who was gifted with a stupendous memory, which was a family trait, known as the "Porson memory." In the families of North, Montagu, and Sydney,—all closely related, there

[1] *Hereditary Genius*, 1869. Reprint, 1892.

is scarcely a name in ten generations that does not represent a person of more than ordinary ability. The Bach family was a family of musicians, founded, so to speak, by Veit Bach, a baker of Presburg, and also an amateur in singing and playing. During two centuries of its existence, in which it passed through eight generations, it produced not only the great Bach, but scores of other musicians of excellence, chiefly organists and church singers, the last one being Wilhelm Friedrich Ernst, who was Kapellmeister to the Queen of Prussia. The family produced twenty-nine musicians of eminence.

Insanity and Heredity. A study of insanity, in its relation to heredity, shows that the nervous condition favorable to insanity is greater in some families and races than in others. Insanity is not directly transmitted to the descendants, but these inherit an organization that cannot endure so great a stress without producing insanity. Servi, in 1872, found that there were nearly four times as many lunatics among the Jews of Italy, as among an equal number of Italians, while Verga, two years previously, found even six times as many. In Germany, Mayr, in 1871, found the proportion of lunatics to every 10,000 Germans was 8.6, while that to the same number of Jews, was 16.1.[1] In a Connecticut asylum eleven members of the same family were confined successively. Berti found, that in four generations of a family, descended from a melancholiac, ten out of the eighty individuals were subject to melancholia, nineteen were neurotic, three were endowed with special ability, and three had criminal tendencies. It is a well-known fact that in certain reigning

[1] Cf. Lombroso, *The Man of Genius*, p. 136.

families of European countries insanity in various forms has been prevalent for many generations. A notorious family of this country, that has cost the state, in which it resided, more than a million dollars, descended from a man who, among other things, was a great drunkard. In the course of less than a century, this family inflicted upon society two hundred thieves and murderers; two hundred eighty physically decrepit individuals afflicted with blindness, idiocy, or consumption; ninety dissolute characters, and three hundred children that died prematurely.

Heredity and Evolution. While there is no question about transmission of congenital characters (those possessed at birth), the difficulty comes in accounting for racial change and progress, as is necessary in sustaining the general proposition of evolution—and evolution as a method of nature can no longer be regarded as a mere theory. It is evident, from the evolutionary point of view, that the offspring must inherit *more* than the parents inherited, else the former would end just where the latter did. The questions confronting us at this point are just what characters are transmitted, and how.

Theories of Heredity—Lamarck's Theory. Three theories of heredity have been advanced to account for evolution. The first is, that besides transmitting the congenital characters, the parent also transmits changes produced in him by environment and habit acquired during life. For example, a primitive man, living under favored circumstances, finds toil and forethought unnecessary, because there is abundance of food about him that needs but to be appropriated. Furthermore, it is impossible, because of its perishableness, to store

the food, and, because of the lack of all law and respect for proprietorship, to hold the food, were it gathered for future use. Such a man would naturally have a positive aversion to toil, and would exercise little forethought. However, let the circumstances change. He is no longer in a tropical garden. He procures scanty food only after putting forth effort. He becomes fisher, hunter, agriculturist. He must clothe himself and build his shelter. He must tend to his flocks and store the fruit of his labors for the long winter. He must now defend his rights. He acquires habits of industry, thrift, and thoughtfulness. During generations these acquired characteristics become fixed and transmissible by heredity to the offspring; and the offspring, starting with such congenital traits, still farther develops along that line. This is practically the view of Professor Lamarck, advanced in 1792.

Darwin's Theory. The second theory that we may mention, the theory advanced by Darwin, holds that evolution is accounted for by a natural selection of those congenital variations in the different individuals favoring survival, supplemented by hereditary transmission of acquired variations. The latter part of this theory, we see, is Lamarck's. According to the first part, all forms of life, including man, that are best adapted to the environment are fittest to survive, and as a matter of fact do survive, while the others fail to thrive and finally are entirely eliminated. For example, the presence of insects with rudimentary wings, on a mid-ocean island, can be accounted for on the supposition that the insects equipped with wings to bear them up into the air would be carried out by the wind onto the ocean to

their destruction, while those less favored as to wings would be left to propagate their kind; and after countless generations of such natural selection, or elimination, a species of insects with only rudimentary wings would be the result—a species best fitted to survive on the wind-swept island. Or in the case of man, it is evident that the industrious, ingenious, and thoughtful one could maintain himself better than the indolent, shiftless, and unintelligent. In other words, the man fittest for the environment survives, while he who is not fit goes to the wall.

Weismann's Theory. The third theory, that held by Professor Weismann in his work of 1883,[1] practically accepts the first part of Darwin's theory, but denies transmission of acquired characters. According to this view the selection that occurs is not external, as was held by Darwin, but internal in the germs that produce the new individual. The variations that occur in succeeding generations are the result of new combinations of the germ-plasm, which is transmitted from generation to generation unchanged by external influences. Later, however, Weismann was forced to abandon the claim concerning the absolute stability of the germ-substance and to admit that congenital variations may come about through external causes, such as climatic changes.

Transmission of Acquired Characters. Though the question of heredity is acknowledged to be an extremely complex one, and every one of the theories mentioned encounters serious difficulties, yet it may be regarded as settled that the facts of evolution as known point to definite, progressive changes, which produce new types

[1] *Entstehung der Sexualzellen bei den Hydromedusen.*

of structure in succeeding generations. Furthermore, the fact that anomalies, or variations from the typical forms at birth, are observable in some individuals, lends support to the theory of hereditary transmission of traits or characters acquired by the individual. At any rate, neither natural selection alone nor sexual selection unaided by external influences seems to be able to account for all the facts. The Weismannian theory seems to explain best the constancy of general characters, and also to account for some advancement of the race. Natural selection undoubtedly helps to eliminate certain traits and thus assists indirectly in bringing others into prominence. Yet after all it is impossible to understand how, e. g., a highly complex act involving a coördination of various movements, such as an instinct, should be able to arise and progress along definite lines, unless we also assume that these acts were once performed with some intelligence, which lapsed when the act became automatic and hereditary. Therefore, it seems reasonable to assume that hereditary transmission of acquired characters is a fact.[1]

If, then, hereditary transmission of individual acquired variations is a fact, then the principle of habituation, already considered, is not only a factor in the life of the individual, but affects certain cells, so that the offspring inherits the parents' habits as disposition or tendencies. It is perfectly natural that if the child inherits a highly organized nervous system, he should also inherit an aptitude for its appropriate use. At any rate, according to this theory, a large class of emotional atti-

[1] Cf. H. F. Osborn, *Present Problems in Evolution and Heredity*, Cartwright Lectures, 1892.

tudes are explained, and certain traits, impulses, and instincts can be accounted for. It is hardly necessary to remark here that the transmission of definite states of consciousness, appearing in the offspring as innate ideas, finds no support whatsoever in facts, and should be regarded as an entirely unwarranted tradition long ago shelved by psychologists, notably by that great English thinker, John Locke.

CHAPTER VII

IMPULSES AND INSTINCTS

Having seen that habituation is a sort of organic memory which mechanizes our various activities, and that heredity is a kind of racial memory which transmits the congenital and acquired traits of the individual to succeeding generations, we are now better prepared to understand the nature of impulses and instincts.

Old View regarding Nature of Instinct. Before the significance of habituation and heredity was understood as fully as now, the source and nature of impulses and instincts were a matter of considerable speculation. The view that was generally accepted was that instincts are the expressions of connate, or inborn ideas. For example, the bee has the instinct to build a honeycomb and then to fill it with honey gathered from various blossoms. The bee, according to this theory, has the inborn ideas of a hexagonal cell, the material of which it is to be made, the purpose of the cell, honey-bearing flowers, etc.

Modern View. The generally accepted modern view is that impulses and instincts are complicated nervous reactions occurring under certain conditions or stimuli and coming about just as necessarily as the secretion of bile by the liver, or tears by the lachrymal glands. And this does not come about by chance, but because there has been transmitted by heredity an adjustment or predisposition in the nervous mechanism to react in definite

ways, which adjustment became established through habitual acts during countless generations, together with natural and organic selection.[1] Thus the discharge of an impulse or instinct means, in a measure, the reënactment of remote ancestral life. The infant but a few days old will clutch one's fingers placed in the palms of its hands so firmly, that if the fingers be raised the child will be drawn up and remain suspended in the air for a moment or two. Undoubtedly, the impulse to clutch and hold on was firmly established in our arboreal ancestors.

Impulse and Instinct Compared. Impulses and instincts are fundamentally alike, namely, a motor disposition of the nervous system to discharge in more or less definite ways on the occasion of the appropriate stimuli. As compared with instincts, impulses are simple and indefinite reactions. On hearing a sudden loud sound we have the impulse to cry out, startle, turn, run, or assume a combative attitude. With a barking cur at our heels we can scarcely walk on without turning again and again. It is impossible for most people, especially the young, to refrain from being more apprehensive of danger in the dark than in daylight. While such impulses seem to have a purpose, they are evidently more direct yet less to the point than an instinct, such as the mating instinct, which shows itself in the discharge of a series of impulses not at all closely connected in time yet all leading to a definite end. The pluming, singing and calling, the strutting about of the male bird in the presence of the female, then the seeking of a suitable building place and the constructing of a nest, the

[1] Cf. H. W. Conn's *The Method of Evolution*, New York and London, 1903.

incubating and finally the care of the little nestlings—all these impulses are a series having essential relation to each other, and constituting a single instinct having for its end the propagation of the race to which the actors belong. The difference, then, between impulse and instinct lies in the complexity and not in the nature of the reactions. In fact, in many instances the two terms may be used interchangeably.

Instinct in Animals and Man. Instinct-reactions occur in man as well as in animals, although the best illustrations of instinct may be found in animals. The charm and interest of nature-study is in no small measure due to the instincts of the various forms of animal life. We are immediately impressed with their fine adaptability, which seems to surpass even intelligence, and with their unerring certainty that knows no alternative. In nature all teeming with life, each separate form of it striving and struggling for the same end, viz., self-maintenance and the propagation of its kind, we find that each species has instincts peculiar to its needs. And yet, just as there is a continuity and relativity of life, explicable by evolution, so with the innumerable instincts in the species, from lowest to highest, there is a relativity as well as continuity that speaks unmistakably of the oneness of all life. Man is no exception, and not a few and not insignificant are the instincts that make his life what it is.

Instinct to Live. The earliest and most potent instinctive passions and acts relate to the preservation of individual life. Life furnishes its own inertia for continuance as love of life and fear of destruction. The instinct of self-preservation is a constant affirmation of life, and is possessed by all but the lowest living creatures.

They love life and fear destruction as they love and fear nothing else. To take another man's life is the greatest offense that can be perpetrated against society, and we shudder at suicide as abhorrently unnatural. Men prefer lives of hardship and suffering to extinction on earth. We will endure almost all things in order to meet the conditions of this life, in spite of the fact that we are often reminded of its worthlessness and hollowness. From the time of the book of Job, and Hegesias, down to that of Hartmann and Schopenhauer, it is pointed out in graphic language and forcible logic that "all is vanity," and yet there are practically no philosophical suicides.

Racial Instinct. With the instinct to live goes the complementary instinct for the extension of individual to racial life. If the instinct of self-preservation is selfish, this other instinct is getting out of self—it is altruistic. As the mating instinct it leads to the tenderest affections and holiest ties of life. The sweetest song in the forest and the most rapturous verse of the minstrel, the most self-denying, self-forgetting bravery, the loftiest chivalry, as well as reproduced life, owe their existence to this instinct. No wonder love is the all-absorbing theme in literature and the inspiration of song. As the parental instinct it shows itself in the extraordinary love and care for the offspring, and makes home the institution it is. In fact, the sex-instinct is so powerful, fundamental, and all-pervasive, that every department or aspect of life is influenced by it to some extent.

Subsidiary Instincts. In these two primary instincts we have the mainsprings of human life and activity, and out of them there grow, as it were, other, subsidiary instincts. Though not so basic, some of these are in ways

higher and nobler, while others are disapproved by modern standards of ethics.

Deception. The instinct of deception, or feigning, primarily for the preservation and furthering of life, as seen in animals and insects that feign death when danger threatens, was perfectly honorable in the remote past, as the Homeric times. The ancients even made Hermes the god of cunning, deception, and of thieves.

Acquisitiveness. The instinct of acquisition is stronger in civilized peoples than in the savage. As the squirrel must lay up stores for winter, so the conditions of life in cultured nations require ample provision for the future. Covetousness, greed, frugality, and stinginess are forms of this instinct.

Play. The instinct to play begins in infancy and lasts through life, although, as a rule, the older one gets the weaker the instinct. Childhood days are the days of play; youth, of dreams and ideal projects; manhood, of stern duties; old age, of retrospection; but even beyond childhood, like a silver thread, runs the instinct toward the imaginary, make-believe conditions and contests, friendly rivalry and display of skill and strength of body and mind. In play the child finds an outlet for its pent-up energies and exercise for its powers; and in play the adult has recreation for mind and body.

Imitation. The instinct of imitation, possessed by all to a greater or lesser extent, is particularly strong in childhood and the formative period of life, possibly in part owing to the weakness of inhibition. In the make-up of man there are many impulses and instincts that guide him in the preservation of his life—the impulses, or instincts to eat, exercise, etc., but in addition to these is

the instinct to imitate as a supplemental and additional safeguard. What others eat and drink we may eat and drink; what others do we may do. Often, to be sure, imitation is mere apishness, or it may even lead to bad results. When, however, a certain act or course in another is observed to be fatal to life and happiness, the instinct of imitation yields to the stronger instinct of self-preservation. Imitation is not only biologically important, but it is one of the prerequisites of civilization. Without imitation there can be no extensive language, no customs and manners, no law, no erudition, no science—in short no educability. Without imitation our social life would be extremely primitive or, at least, extremely individualistic.

Inquisitiveness. Inquisitiveness is another instinct that man has in common with the higher animal species. Its lowest form is idle curiosity, but it may be so strong as to resemble hypnosis, especially in animals. Hunters often attract their game by queer sounds, or by exposing bright cloths. Hindoo "snake charmers," by their weird piping, draw the serpents from their hiding places. The higher form of inquisitiveness is the desire to know, to understand the world and life, not for the practical purposes to which some knowledge may be put, but for the satisfaction of the instinct: for the sake of truth. And it is due to this instinct, to "wonder," as Plato calls it, that philosophy and the sciences have arisen and been carried on. Every school and apparatus of research is an expression, at least in some measure, of this noble instinct.

Ethical and Religious Instincts. The ethical instinct prompts men to view individual acts and motives in their

relation to society or the world, and impels them to conduct that is in accord with the larger interests. The religious instinct, which is perceived as a feeling of dependence, of insufficiency of self, and a fear of and love for a superior power, impels men to build altars, make images and pilgrimages, to worship and adore, and to "seek God, if haply they might feel after him and find him."

Social Instinct. The social instinct impels men to avoid solitude and to live together in tribes and communities, and to band themselves together for defense and offense. Thus this instinct is the foundation of the state, the most powerful institution in existence, having disposition over property, life, and death. But these larger social bodies do not satisfy; there must be, in addition, the clique, the set, the secret society, club, lodge, fraternity, guild, trade-union, to say nothing of the church and home as social institutions. The modern life of individualism, on the one hand, especially makes felt the need of social grouping and organization, on the other.

Consciousness and Instincts. Impulse and instinct-reactions at first occur without consciousness, especially in animals and infants, but later undoubtedly they are accompanied by a directing consciousness. The possessor of an instinct is more or less clearly aware of the various steps in its realization, though not conscious of its purpose. The young male bird, singing and calling and displaying his plumage, does not know all is to win the affection of the female. The young bird-couple, seeking a suitable building place and then constructing their first nest, in all probability are unconscious of the purpose of

it all. Each brief and simple act is to them its own motive and reward in the satisfaction it affords; it never occurs to them that the real purpose of nature is the maintenance and propagation of their kind. That all instincts, however, are modified a little by a grain of directing intelligence found in the life possessing it, should not be forgotten.

In man instinct is greatly modified and frequently even checked by consciousness. We cannot predict his course or behavior as we can that of an animal. Human instinct appears rather as a tendency, desire or proclivity, than as reflex, automatic conduct, notwithstanding it attains its end in some of its forms as unfailingly as if it were completely mechanized process.

Instinct and Reason. Instinct is clearly to be distinguished from rational action. Reason adapts its act to the end to be attained. The end, or purpose, is clearly perceived, and the means *chosen*, as experience may warrant, for the attainment of that end. Instinct, on the other hand, neither is clearly conscious of an end, nor does it choose the means for the end.[1]

Stimuli producing Instinct-Reactions. Instinct-reactions do not occur indiscriminately, but usually only in response to the appropriate stimuli. These are as varied and numerous as the instincts or impulses. Age and sex, occupation and experience of the individual, climatic conditions and nature of environment in general, be it physical, social, moral, or intellectual—all these serve as stimuli to impulse and instinct-reactions. Therefore we find that there are instincts peculiar to the various periods of human life. The instincts of

[1] Cf. G. J. Romanes, *Animal Intelligence*, New York, 1884, pp. 10–17.

childhood are not those of later life. The girl's inner promptings lead her to dolls, while the boy takes to whips and horses and guns. It is in the spring that young people turn to poetry and thoughts of love. It is in the fall that migratory birds move southward. The mysterious power of large bodies of water has long been recognized in myth and song. Hylas is drawn into the water by the Naïads. The Sirens enchant with their song. Lorelei draws the boatman to his destruction in the eddying stream.

Untimely and Atavistic Instinct-Reactions. We said that instinct-reactions occur usually only in response to the appropriate stimuli. When a beaver in confinement begins to build a dam across the room of such objects as it may happen to find, or when a hen sits on pieces of chalkstone instead of eggs, we feel that the instinct has missed its mark. Instincts may be premature, as when a precocious child has the ambitions and feels the sentiments of a mature person; or instincts are belated, when they appear at a later age in life than is usual, as when a full-grown person is possessed of the desire to play to the exclusion of work. In case an instinct appears that points to an earlier stage of evolution of the race, it is said to be atavistic. The love for teasing, tormenting, practicing cruelty on man and beast, the delight in war and bloodshed, in hunt and brute sport, is to some extent either atavistic or perverse instinct. But, no doubt, there is more or less of this in the modern man left to him as a heritage of a former time, when war, pillage, combat, and chase were the order of the day. The spirit of gambling, too, is presumably an instinct-remnant of the life of uncertainty in the crude occupations of our ancestors,

further accentuated by their conception of an arbitrary, whimsical nature and race of gods.

The tendency to superstition and unbounded credulity in some directions, in spite of the conception of universal law reigning in the world, is to be regarded both as a childhood-habit and as a transmission from the countless generations gone before, who had not the modern idea of cause and effect and natural law. In fact the larger part of their experience was necessarily merely independent phenomena for them, mere chance, the result of crude whim of the forces of nature or of the spirits and gods of their environment. Song, incantation, pronouncing of the magic formula, the proper sign or offering by any one or by the god and nature-constraining priest, checked the burning fever, bound the sun in the sky, drew water from the flint, summoned the shades from Hades, and accomplished other wonderful and impossible things. And it will be many centuries yet before the race will lose this instinct to believe the illogical and impossible. The press of to-day records ever new and varied cases of superstition so utterly strange that we are almost taxed beyond our limit in believing even the correctness of the accounts. Some prophet or prophetess arises (we recognize the relatives in Bedlam) and drags forth an antique myth or a novel furious theory, and, lo and behold, thousands forthwith embrace it as divine truth. A new seer foretells a second deluge to occur at a stated time, and, presto! disciples congregate from distant parts of the world to assist in the construction of another ark and the collecting of a menagerie, etc.

Perverse Instinct. Perverse instincts are also com-

mon. We all have heard of "tomboys" and "sissies." Some men have the instincts of women, and *vice versa*. The man likes to adorn himself with effeminate fineries, even to the extent of masquerading in woman's clothes, as did Lord Cornbury (a cousin of Queen Anne), who was once governor of New York. Often was he seen promenading thus attired and with the coquetry of a lady, on the walls of the Bowling Green fort. The woman—"the new woman"—pleases herself most in appearing as masculine as possible, with a man's hat, shirt, collar, etc., and being engaged in masculine sport and occupations. She scorns a girl's schooling, suited to bring out the distinctively feminine qualities; her education must be alongside of the boy, etc. Impulses of self-injury or self-destruction are widespread and common. Men and women withdraw from the world and become recluses; they fast and scourge themselves and cast themselves under the wheels of the cart of Juggernaut, or hang themselves to the beam. Two lovers, without apparent cause, throw themselves into the water to drown. A young lady, on the eve of her marriage, goes up to her chamber and without provocation blows out her brains. These seem to be cases of self-sacrifice for the sake of self-sacrifice, and are, in very many instances, directly traceable to the sexual nature. "Self-sacrifice for self-sacrifice's sake," says a specialist in mental pathology, "whether it take the form of unsweetened tea, of monastic vows, or of a cut throat, is always of sexual origin, and is merely an aberrant manifestation of the tendency to injury of self, which accompanies the production of offspring." [1]

[1] Charles Mercier, *Sanity and Insanity*, London, 1895, p. 356.

Importance of Instinct. Even from this brief review, the importance of instinct in man is apparent. Man's reasoning power is continually emphasized and appealed to so that we are prone to make light of the earlier and so-called "lower" processes. But as instincts are earlier, not in the scheme of evolution, but in the life of the individual, than some of the "higher" and "nobler" processes, so they may be regarded as more fundamental. Every normal human being born brings with him, as a rich heritage of the countless generations that have gone before him, their accumulated experience stored, as it were, into his very make-up, which adapts him to his environments, and determines, in the main, life's course.

CHAPTER VIII

FEELING

Difficulty of Definition. States of consciousness cannot very well be explained in words, and this is especially true of the affective states, called feelings, emotions, and sentiments. But, fortunately, every one knows by experience what these are. We are not concerned here particularly to define the exact meanings of the words (for we believe that the states for which they stand do not differ qualitatively), but to determine their nature and show their significance. However, in passing, it is both interesting and profitable to note briefly a few uses of the terms.

Different Definitions and Views. Ordinarily the words *sensation* and *feeling*, and even *knowing* or *thinking*, are used synonymously, when we speak of feeling tired or sick, or feeling thus and so about a person or object, on the one hand; and feeling pain, love, peace, and the like, on the other. "All knowledge," says Professor Dewey, "occurs in the medium of feeling. . . . There is, in other words, no consciousness, which is not feeling." [1] In the narrower sense of the word, feelings are regarded as the most "subjective" or inner mental experience, while emotions, and particularly sensations, are physical, or objective. Others, again, regard feelings and emotions as two different affective states, the

[1] *Psychology*, New York, 1892, p. 246.

latter of which being feeling plus a general or a restricted or bodily excitation. Thus Külpe's view of the emotions and impulses is that they represent the fusion of sensations and feelings.[1] According to this view, feelings are only those mental experiences accompanying sensations and thought, which express in consciousness pain and pleasure, other differences being accounted for "by changes in duration, intensity, and concomitant sensations."[2] Another view is that no distinction is to be made between feelings and emotions, for the qualitative difference between feeling and emotion is no greater than the qualitative difference between two different emotions, or two different feelings. "Substantially the same mental state, so far as distinctions of affective quality are concerned, may be called simply a feeling, or an emotion, or a passion, or a sentiment."[3] We shall soon see that this view, expressed by Professor Ladd, is correct.

Nature of Feeling. The discussion of the nature of feeling has of late been a psychological storm-center, and in order that we may clearly see just what it is, it will be necessary to review briefly the theories or opinions held in regard to the nature of feeling.

The Common View of Feeling. There are two views regarding this. The first of these is that feelings are pure states or activities of the mind arising on the occurrence of an idea. Love, hatred, anger, hope, disdain, etc., are spiritual states, differing essentially from sensations, which are occasioned by external stimuli. But

[1] *Outlines of Psychology*, London and New York, 1895, § 52, 2.

[2] Külpe.

[3] *Psychology Descriptive and Explanatory*, New York, 1894, pp. 534–535.

feelings affect the body in various ways, and then we may note the *expressions of feelings*. Thus fear is followed by trembling, pride by strutting, anger by flushed face and fiery eyes.

In its physiological aspect, the affective process arises in the brain on the perception of the appropriate object or occurrence of the idea, and extends thence to the periphery, and then back again to the brain. The finer, subtler feelings would, according to this theory, be restricted to the brain, while in the more sensual, coarser emotions, the nerve-commotion extends more generally over the body.[1]

The James-Lange Theory. The other view is radically opposed to the first. It contends that emotions and the emotional attitudes (erroneously called expressions of emotion) can only be explained genetically, that is, in the light of development. To understand the matter, it must be approached from the standpoint of origin. Emotion, according to this view, does not arise primarily in the mind on the occasion of a definite idea or perception of an object, which then produces a change in the body that is the expression of the emotion, but first an object is presented; in regard to this the body performs certain acts or assumes certain attitudes, which then become reflexive and instinctive in the course of time. The perception of these bodily states constitutes the emotion. In other words, to express it in a "slap-dash" manner, as James has styled his own words, "we feel sorry because we cry, angry because we strike, afraid

[1] For a strong presentation of this view, see Sherrington's *The Integrative Action of the Nervous System*, New York, 1906, pp. 257–268.

because we tremble," rather than that "we cry, strike, or tremble because we are sorry, angry, or fearful, as the case may be." [1] This, in brief, is the *discharge theory* of feelings, so first styled by Professor Dewey, but usually designated the James-Lange theory.

Considerations favoring Discharge Theory. The considerations that seem to favor the discharge theory of emotions are many. Some of them are given below.

Emotional attitudes are those movements and conditions of the various parts of the body invariably accompanied by feelings of some sort or other. The skin, the various glands, the blood-vessels, bowels, liver, heart, kidneys, etc.—all undergo change under conditions. To an observer these attitudes indicate the presence of emotion in the affected person, but the latter cannot represent to himself the feelings without the attitudes. If we abstract the sensations yielded by an attitude from the feeling, we have nothing or little left. Try to imagine fear without the trembling and confusion! Or anger without the quickened heart-beat and respiration, and the dilation of the blood-vessels, as well as the general tension of the entire muscular system! To the extent that we check or inhibit the attitudes, to that extent do we modify or abolish the emotion. As long as we assume a calm, cool appearance, so long are we not very angry or afraid. But let us strike or run, and we are thoroughly angry or afraid.

It frequently happens that a person has feelings out of keeping with his thoughts and surroundings. Fear may suddenly come upon him, or joy, or other feelings. It may be observed that children are often afraid of

[1] *Psychology*, II, p. 450.

persons and objects, which they know well should not be feared. I remember being afraid on one occasion of an older sister after she put on a man's rain-coat and hood, and had used a burnt cork on her face. My judgment, at the time, condemned my fears, for I had witnessed all the preparations of the disguise. The case related of O. G. in a former chapter (p. 88) excellently illustrates how fear may overpower even a mature man, in spite of his judgment, which condemns it as foolish and groundless. The insane have a variety of moods and emotions coming and going quite capriciously and unrelated to the outward events of their lives. These facts can be explained satisfactorily only on the ground that there is a nervous discharge, either spontaneous or induced by some stimuli, which produce the emotional attitudes, hence the emotions themselves.

Origin of Emotions. It is now necessary to show why certain discharges, resulting in emotional attitudes, take place in the normal person on the occasion of the appropriate object or situation. While some emotional attitudes cannot be accounted for by the teleological principle (viz., that the attitudes served some end), such as dryness of the mouth, and disturbance of liver and viscera in fear,—phenomena which Wundt accounts for by the principle of direct change of innervation, and Darwin by the principle of direct activity of the nervous system—it is probable that many of them, to say the least, were not accidental in their origin, but served specific purposes. Let us suppose that a primitive man without fear meets a bear. An encounter occurs. The man struggles, perspires, and finally takes to his heels. Again and again, through the centuries, similar expe-

riences occur, and each time there is exertion and the attending quickened heart-beat, perspiration, turning and fleeing, until these things, through heredity, have become fixed as a racial tendency. Now when the bear appears on the scene, it suffices to discharge these inherited tendencies, and the reaction occurs. Cold perspiration appears, the heart beats fast, trepidation takes the place of the struggle, and flight carries the man far from the fearful object. To the man without fear the bear is not fearful. The bear is only fearful because it produces a reaction, which is felt as fear. Or in anger, the fiery flashing of the eyes denotes rapid surveying of the antagonist, the accelerated beating of the heart means a warming up for action, the showing of the teeth a preparation for their use. The far-away look in the eyes is the attitude of longing—directing the sight to that which is far away. James says that "the connection of the expression of moral and social disdain or dislike, especially in women, with movements having the perfectly definite original olfactory function, is too obvious for comment." [1] And so with other attitudes—originally they seem to have been definite acts serving an end, as Darwin has shown in his *Expression and Emotion*. Emotions, therefore, are not accidental, but have developed from acts performed for a purpose. Of course, it is difficult to demonstrate this in respect to all feelings, especially the finer and subtler ones.

Tone of Feelings. While there are all shades and kinds of feelings, usually they are felt as pleasant or unpleasant, and this constitutes the *tone* of the feelings. Tone follows its own laws, and has attributes, viz.,

[1] Op. cit., II, p. 482.

quality, intensity, and duration. The qualities, two in number, are pleasantness (pleasure) and unpleasantness (pain), each having many discriminable shades and varieties. Sensations near the point where they are just perceived (having liminal value),[1] are usually unpleasant, but as the intensity of the sensation increases, the unpleasantness is gradually changed to pleasantness, reaches its maximum value, and then becomes again unpleasantness, as the intensity of the sensation increases.

Sensation, Tone, and Feeling Defined. We may, then, discern three closely related yet peculiar mental phases, each having its peculiar physiological conditions. But unfortunately there is yet no uniformly accepted terminology to designate each. However, we would define *sensations* to be those mental states having objective reference; *tone,* that aspect of mental life having either pleasant or unpleasant value; and *feeling,* or *emotion,* that inner experience having reference solely to the affected person, and being neither pain nor pleasure in its essence, though not necessarily without tone, but simply the quality of being felt. Or stated in physiological terms: *Sensation* is the transmission of stimuli from the periphery, including the inner organs, over the afferent nerves to the brain, where a peculiar neurone-discharge takes place. *Tone* (pleasure-pain) arises from variation of the nutrition [2] or peculiar reaction [3] of the cerebral cortex. *Feelings* are the perception of "bodily resonance," vaso-motor affection, or constriction or dilation of arteries.

Have all Feelings Tone? When a feeling has tone,

[1] See p. 143. [2] Meynert. [3] Wundt.

it is either pleasant or unpleasant, or, if the feeling is complex, it may be both. Since we distinguish feelings from tone, the question whether all feelings have tone is pertinent. The answer to this is both affirmative and negative. Undoubtedly, in this respect there are individual differences; we find those who affirm that all their feelings are either pleasant or unpleasant. On the other hand, others cannot detect either a pleasant or an unpleasant quality in some of their feelings. If this observation be accurate, as I believe it to be, then we may deny the universality of tone in feelings. It is certainly not true that every sensation is either pleasant or unpleasant, for very many are neutral in tone; and as feelings are physiologically conditioned, just as sensations are, it follows that emotions like sensations may be without tone.

Again, since certain emotions, such as anger and hatred, are sometimes pleasant and sometimes painful, or since they may change from one tone to the other on the same occasion, similar to the tone of sensations, it is reasonable to expect to find a neutral emotional state in respect to the tone, somewhere between the two extremes. I think introspection finds that to be the case.

Feelings both Pleasurable and Painful. It was said that complex feelings may be felt as pleasurable and painful. That is the case in melancholy or sadness, and jealousy. Normal melancholy arises from a memory of past days and scenes, which is pleasant in itself, and the realization that they are gone, which is painful. Jealousy implies love, which by itself is pleasant, and a solicitude for the object of love and a repugnance for the one who is thought a rival, which are painful.

"O, beware, my lord, of jealousy;
It is the green-eyed monster which doth mock
The meat it feeds on: that cuckold lives in bliss
Who, certain of his fate, loves not his wronger;
But, O, what damned minutes tells he o'er
Who dotes, yet doubts, suspects, yet strongly loves!"[1]

Intensity and Tone of Feelings. In the case of the more pronounced feelings, we usually consider some as pleasurable and some as painful. But the intensity of the emotion may cause a change of the tone or introduce the other tone in addition; or if both tones be present already, change their proportion. Homesickness, when felt in a moderate degree, has the agreeable tone together with the painful, but if the case be an intense one, the latter tone is so prominent that the former is scarcely felt at all. Joy may turn to grief, and the lover's heart ache with love. Emotions may become so intense that their tone is the prominent element in consciousness, and even absorb, as it were, the very emotions, or claim the whole consciousness, so that if it is a pleasurable one, the subject is thrown into blissful ecstacy in which he perceives the glories of another world. "It is for the soul an agony full of inexpressible delight, wherein it feels itself almost entirely dying to all the things of earth and reposes with rapture in the enjoyment of its God," writes St. Teresa about her ecstatic experiences.

Intensity and Duration of Feelings. As yet no law has been formulated descriptive of the intensity and duration of feelings, except in the most general way.[2]

[1] *Othello*, Act III, Scene III, l. 165.
[2] Cf. Ladd, *Psychology Descriptive and Explanatory*, p. 173.

The view has already been expressed that the conditions of feelings are to be sought for in the body. It is plain that the specific influences conditioning its states are beyond determination. In a general way we can say that they are dependent on nutrition and previous discharge of neural energy.

Besides perceiving differences in the kinds of feelings, we become aware of various intensities and durations. Duration is an attribute of all feelings, which is particularly, though not altogether, dependent on the intensity of the latter. Sometimes, after the feeling has lost its distinctness, it lingers as a disposition to other emotions. Thus a feeling may throw us into a mood that lasts for hours and days. The effects of dreams upon the feelings in subsequent waking states, especially in the earlier years of life, is well known. Thus the feelings toward any person may be entirely changed and intensified for hours and days after experiencing a dream about such a one.

Feeling and Associated Idea. Again, every feeling is or tends to be associated with some object or idea. Usually the association is a causal one, i. e., a feeling and its occasion are thought of in a causal relation, but not necessarily so. Often feelings come and, because of their vagueness, are at first associated with nothing in particular; but the mind involuntarily seeks for a cause, and soon finds one. In melancholia the depression is usually accounted for, by the sufferer, by ascribing the feeling to some awful sin or calamity. He may think that he has committed a foul murder or the "unpardonable sin." The same tendency that is found in pathology is present in normal life. A depressed mood, perhaps

caused by indigestion, will produce a feeling of dissatisfaction with our work and surroundings, and sometimes with life in general, as if the latter, instead of the digestive disturbance, were the cause of our depression. The lover esteems the charms and merits of the adored one and of all that is associated with her, several degrees beyond what cold facts will warrant. This is the mysterious power of music—whether it be from the bird wooing his mate; or the Trumpeter of Säkkingen love-trumpeting to Margaretha; or the martial strains inspiring the battalions for the contest; or the mellow peal of the organ and chant of choir, that form such a prominent feature of religious exercises—the emotion aroused by the music is transferred to or associated with the concomitant or nearest object or idea presented. This, too, is the philosophy of display of elegance and pomp that, to a certain extent, clothes and house and business and professional rank do make the man,[1] in another sense than will be pointed out in a later chapter.[2] The dim light and majestic arches of the cathedral go far to dispose religiously the votary within. The twilight shades, or the dim glow of the flickering fire are suitable for fairy tales and revery. It is a well-known fact that during times of special religious awakening there is also more love-making. In fact, that period of life marked with the awakening of love for the other sex, is also the

[1] The mad King Lear with reason says:

"Through tatter'd clothes great vices do appear;
Robes and furr'd gowns hide all. Plate sin with gold,
And the strong lance of justice hurtless breaks;
Arm it in rags, a pigmy's straw does pierce it."

Act IV, Sc. VI.

[2] P. 168.

period characterized by its susceptibility to religious influence and to the beauties and grandeur of nature. The lover is ever reminded of his loved one by the whispering spring-winds, the creek's low song, the blossoms meekly hiding in the grass, the sunset hues and the stars above. He who is enamored of God, ever sees manifestations of his love in nature, in man, and history. It was not mere chance that the Greek mind associated the Beautiful with the Good and the True.

In general, the feelings put their impress upon the judgment. The young person, in the exuberance of feeling, holds his elders in contempt for their apparent resignation to the common, humdrum life, and the barrenness of their achievements. The maturer person, on the other hand, ruefully smiles in his wisdom begotten of years, as he recalls the days when he, too, with boundless ambition or expectation and faith, had the broad world before him. Now he is wiser, for he has diagnosed his own past with its courage, ambition, romance, and ideals, and he pities the impressionable youth, who sees the world in a rosy glamour. But neither knows how to persuade the other to his views, because these are the direct expression of the person's emotional nature. Thus life is continually hedged about by emotion, like the mythical flame about Brunhilde.

Bias of Feelings. We may speak, then, with more than rhetorical truth of the tricks that the feelings play on the judgment. And so general is this that it is hard to imagine the aspect of life in all its various forms, were the fallacious influence of the feelings removed. Probably life without the bias of the feelings would present a rather prosy, mechanical, and uninteresting front—it

would cease to be human—yet undoubtedly one of the great tasks of life is to learn, to a certain extent, to think and act according to reason without dictation of the feelings. Historically the attempt to think and live without the bias of the feelings is represented by the Stoics. Logically Stoicism is admirable, yet in other respects it is strangely unattractive, not to say inhuman.

Teleology of Feelings. Not all but many feelings, in normal beings, are teleological, i. e., either by their tone or by the very nature of the feelings (which resemble instincts in this respect) they conduce to the welfare of the individual and the race. Of those feelings that are not teleological, it is to be said that they are either out of proportion to their utility, or they have just the opposite value from what is expected. A toothache may be far more painful than something more detrimental to health and life. Some emotions, instead of being helpful in certain circumstances, only increase danger to the person. Fear, which ordinarily is useful, may occasionally unnerve and paralyze a man under circumstances that demand even greater calmness, steadiness, and alacrity. Yet in general, pain and pleasure are useful in the furtherance and preservation of life. Instinctively, therefore, all avoid to the best of their understanding, unless moral or prudential motives enter, that which may become disagreeable to them, and by this avoidance further the interests of life. It is evident that if the tone of our feelings were reversed, so that what now is painful became pleasurable, no moral ideas on our part would be a sufficient motive to save us from destructive conduct. Sympathy and love, for example, while at times leading to complete self-negation

and destruction, serve the perpetuity, maintenance, and improvement of the race, and the spiritual growth of the individual.

Classification of Feelings. A satisfactory scientific classification of the endless number and varieties of feelings is impossible, and, in fact, is not necessary, since we have "the goose which lays the golden eggs" (to use a figure of Professor James'), yet to call attention to some typical feelings that have been named, we shall present them in a classification made on the basis of their occasion or cause. We have seen the immediate cause of feelings to be vascular, cerebral, and visceral conditions and changes. But these in turn have their preconditions, which may be considered the first in the series and the mark whereby we can describe and classify the feelings.

a. **Sensuous Feelings.** The most extensive feelings are those occasioned by simple sensations. Sensuous feelings and sensations are, therefore, not the same, but the latter come first in time. To be sure, we speak of sensations as being felt, but *felt* is, in this connection, used synonymously with *conscious*. We are conscious of sensations just as we are of feelings, but this consciousness discriminates between the sensation and its consequent emotion. Thus if the eye be turned toward a surface colored scarlet, there arise the consciousness of scarlet and an additional state of warmth and interest of a pleasurable kind, and this latter state is the feeling. In accidentally cutting one's finger, the first distinct consciousness is the sensation of the blade passing through the flesh and of the severing of the flesh-fibers; immediately after comes the painful feeling.

To the sensuous feelings belong the common feelings

of well-being, sickness, etc. All the organs and members are felt in a general way as a feeling of health, or sickness, or strength, or the like.

The degree in which the various senses call up feelings differs somewhat. Sensations of sight are the least emotional. We can regard objects or surfaces and remain entirely indifferent, or almost so. It is only when the sensation is extraordinary and of colors and outlines more or less artistically arranged, that a feeling ensues. The same is true of sensations of hearing, but not to the same extent. Simple sounds are usually indifferent to us, but when musical sounds are produced simultaneously and consecutively in harmonious measures and rhythms, very intense emotions follow. The power of music, which is so universally acknowledged, as is seen by the uses to which it is put and the attention that it gets among all peoples and classes, is its power to call up emotions. The legends and literature of all tongues abound in illustrations of this. Besides taming wild beasts,

> "Orpheus with his lute made trees,
> And mountain tops that freeze,
> Bow themselves when he did sing."

The singing of the Sirens had an irresistible charm. Lorelei's song made the boatman oblivious of all danger, etc.

Sensations of touch do not differ much from those already mentioned. In general, smooth surfaces passing over the periphery produce pleasurable feelings, while rough ones produce painful feelings.

The feelings arising from sensations of temperature

may be either from warmth or cold. Sensations of taste and smell are the most subjective of all, i. e., sensations of these senses, and especially the latter, are not referred to objects, but are felt more directly as states of consciousness, and these as emotions. This is the reason that we can say scarcely more of smell than that the sensation is agreeable or disagreeable.

b. **Ideational Feelings.** The second class of feelings may be called the ideational, because they follow ideas arising either spontaneously or by information, or discovery. Sorrow, gladness, anger, surprise, hope, curiosity, etc., may come under this class of feelings.

c. **Æsthetic Feelings.** The æsthetic feelings occupy a position midway between the sensuous and the ideational feelings, although some of them seem to be almost entirely sensuous and others almost entirely ideational. Under these come the feelings of the beautiful, the sublime, the grand, artistic, symmetrical, the fitting, the congruous, and their opposites.

As the sensuous feelings arise spontaneously on the perception of the sensations, the æsthetic tastes are largely determined through habit, training, and surroundings. Temperament, of course, is the basic factor.

d. **Personal Feelings.** The feelings arising in respect to self may be called personal feelings. Thus pride, shame, modesty, remorse, conceit, independence, self-satisfaction, and the ethical feelings—duty, approbation and disapprobation of self, peace of mind, sinfulness, etc. —are to be classed among the personal feelings.

e. **Altruistic Feelings.** Another class of feelings may be called the altruistic. They are evoked by other beings, either animals or men, or the ideal self or God.

Here is to be mentioned the social feeling, and that of dependence, of equality, and of superiority; of gratitude, prayer, and trust; of sympathy, either as joy or suffering evoked by similar experiences in another being. Love, or affection, is altruistic, called forth by and directed toward living beings. The grounds for it are relationship, such as the mother for her child; congeniality, as the friend for friend, either of the same or opposite sex; worth, as man for his hero; and familiarity, as the master for his dog. Specially quickened religious consciousness comes naturally at a time in life of broadening out and enlargement of powers and functions both mental and physical. This new and intensified religious feeling, coming as it does at times with a suddenness and intensity of a "new birth," popularly called "conversion," almost always occurs between the twelfth and twentieth years of the person's life.

Morbid Feelings. Feelings are morbid that are habitually not in accord with the rest of the mental content in intensity and nature. Perhaps no person is entirely free from occasional inharmonious mental states, yet some are afflicted more than others.

Causes of Morbid Feelings. A deranged nervous system, or vascular or organic disturbances, may be the direct cause of morbid feelings, yet indirectly they may be brought about by giving undue attention to the feelings as such, or living a life too emotional. As the feelings may be cultivated in the right direction—and to see to that is an important function of religious teaching and practical ethics—they may also be mis-cultivated. *Ennui* and the *blasé* feeling result, so to speak, from emotional exhaustion. Nothing can please any longer

because the person has pursued pleasure too long and persistently. Every community has those to whom the world can afford no more pleasures. Sentimentality is mawkish sentiment. Nothing is more essential to manhood and true culture than wholesome sentiment; nothing more nauseating than sentiment that is ever copiously called forth by unwarranted objects and situations —that is sentimentality.

Excessive novel-reading and theater-going, and much that goes under the name of religion, are fruitful sources of morbid feelings. To be stirred by imaginary scenes and situations that do not afford opportunity for action, yet call for it, cannot but have disturbing results upon our mental life. The illustration of the lady shedding copious tears over the troubles of the hero in the play, while her waiting coachman is freezing outside, contains the point of the matter. The "religion" that puts its chief stress upon the feelings, as if they were the essence of religion, cannot but have a morbid effect.

So it may be said in general, no matter what kind of a feeling it is, if the person seeks the feeling for the sake of itself, rather than the object that gives rise to it, the result will be psychical sickness. Mental health requires that the landscape, e. g., be viewed for its own sake and not for the feelings it calls up; that we attend the funeral out of respect for the dead and sympathy for the friends, and not because "by the sadness of the countenance the heart is made glad;" that we maintain a harmonious attitude with our ideals and society, because it is a duty, and not for the happiness and peace of heart,

CHAPTER IX

SENSATION

Definition. Sensation may be defined as the peculiar mental experience coming through the sensory neurones and their end-organs (eyes, ears, nose, etc.), on the occasion of external stimuli. For example, the clock strikes the hour and we *hear* the sound; or we open our eyes and experience sensations of color and light.

Two Meanings of Sensation. Sensation may be considered both as a process and a resulting state of consciousness. As a process it presents itself as a physiological problem. In psychology sensation as a state of consciousness has the chief interest for us, and yet it is here more than perhaps anywhere else, that we are confronted with the physiological conditions.

Sensory Neurones and their End-Organs. Impressions from the physical world—including those from the body—are transmitted to the cortex of the brain through sensory neurones of the first and higher orders after having been received by means of specific organs of sense, all of which were described in Chapter II. In very simple life, where there are found the mere rudiments of a nervous system, the so-called superficial cell is affected by many kinds of stimuli of sufficient intensity, but as we ascend in the scale of life, functions of various kinds are differentiated. Those cells that are especially sensitive to a particular stimulus have become so modified

through a long process as to be susceptible only to that particular kind of stimulus. In man we find a certain number of peripheral sense-organs, already described, each capable of receiving only a definite impression from a definite stimulus. The eye is affected only by light-vibrations, the ear only by sound-vibrations, etc. If we are able to irritate any sense-organ by means other than the natural, as e. g., electricity, the conscious effect will be entirely determined by the particular organ, and not by the nature of the irritant. Thus an electric current applied to the tongue will be felt as a sensation of taste; applied to the eye, as light (color); to the ear, as sound, etc. When a so-called cold-point in the skin is stimulated, be it with the point of a pencil, an electric current, or an icicle, the resulting sensation will be of cold.

Sensations Classified. A classification of sensations is, therefore, a simple matter, it being effected on the basis of the sense-organs through which the sensations are aroused and the nature of the physical stimuli. Yet it is to be remarked that no sensation is ever experienced that is purely of one kind. The sensations that we ordinarily ascribe to taste really include smell and touch. Sensations of sight are blended with the muscular sensations arising from the adjustment and control of the eye. Sensations of touch do not occur without sensations of temperature, etc. Nevertheless, we easily discriminate sensations of touch (pressure), sight, hearing, taste, smell, temperature, and muscular and joint sensations.

Smell. Sensations of smell are usually occasioned by bodies that give off particles of substance in gaseous form, which come in contact with the olfactory nerves,

located in the nasal cavity. The sense of smell is more highly developed in the dark-colored races than in the white and civilized races, and it differs greatly in different white individuals.

Taste. Sensations of taste arise from contact of tastable substances with the gustatory bulbs, located in the tongue and the posterior portions of the palate. There are four kinds of tastes, viz., sweet, bitter, sour, and salt.

Touch and Temperature. Sensations of the skin are those of pressure and of temperature. In common experience these two kinds of sensation are both derived through one organ (viz., the skin), yet experiment has revealed the fact that the skin has both so-called pressure-spots and temperature-spots, which respectively yield the sensations of touch, or light pressure, and those of temperature. Temperature-spots are both those of heat and cold. The heat-spots respond only to heat-vibrations, and cold-spots only to cold. Experimenters have carefully mapped out the different areas of the skin as regards the pressure-spots, and heat and cold-spots.

Muscular and Joint-Sensations. Then there are muscular sensations, which arise through the nerve-fibrils found connected with muscular tissue, when the various muscles are used; and sensations of the joints, arising through the nerves found about the joints, in case of movements and mere position of the various parts of the body.

Sound. Sensations of sound are produced by sound-vibrations stimulating the inner ear, in which are located the nervous end-organs of hearing, notably the so-called "organ of Corti," consisting of a membrane in

which are strung numerous fibers. Sounds are of two kinds,—musical sounds and noises. Musical sounds are produced by bodies vibrating rapidly, continuously, and isochronously; and their characteristics are pitch, intensity, and quality, or timbre. A noise is produced by a mixture of many varieties of vibrations bearing no relation to each other. It seems also that sensations of bodily balance or equilibrium arise in the semicircular canals of the ears. At any rate, disease or an operation in these parts may temporarily impair the power to maintain bodily equilibrium.

Sight. Sensations of sight (light and color) are produced by light-waves impinging upon the retina of the eye, where certain photo-chemical changes take place, affecting the so-called "rods" and "cones." The nervous excitations produced by the light are conducted to the brain by the optic nerve. We are able to discriminate many degrees of light, varying from white to black, and thousands of different shades and qualities of color. Nevertheless, there are but six fundamental color-sensations, viz., green, red, blue, yellow, white, and black. When two colors combined produce white, they are called complementary colors. The colors found in the opposite sections of Figure 9, are complementary colors. When any object or scene is looked at for about one third of a second, and then the eyes be closed suddenly, an after-image of it may be seen. If the object is colored, e. g., red, and is exposed to our eyes for a longer time, and then be removed, we may see an after-image in bluish green, which is the complementary color of red. Some persons are color-blind to certain colors, such as red, green, and violet. In total color-blindness the differ-

ent colors, outside of white and black, are discriminated as different shades of gray.

Similarity and Difference. Within the limits of each class, the sensations are felt to have similarity, while the different classes are felt to be radically unlike. Sweet and bitter seem opposed to each other in quality, and yet there is an indescribable something common to these sensations so that they are comparable. But, excepting spatiality and externality, a sensation of one group is not even comparable with that of another. For instance, there is no comparison between *blue* and *sweet*, or the odor of a rose and the sound of a voice. We feel the incongruity of even the suggestion of a comparison, so remote in quality are these sensations.

Different Sensations Associated. To be sure there are associations, in consciousness, of things ever so remote. Green and sour are absolutely different as sensations, and yet we say that a fruit tastes green, meaning sour, because it is a frequent occurrence that a fruit is green and sour at the same time. Painters speak of warm and cold colors, meaning the quality that colors show in the warm sunlight as distinguished from those in the shade.

Association Based on Functional Relationship. But associations resulting from contiguity in space and time do not explain all associations of different sensations. For instance, why do we speak of a sweet smell, face, or voice? Undoubtedly because of the sameness of the emotional tone which these disparate sensations arouse. The mind tends to associate similar states of consciousness and consequently also the objects and attributes that arouse them.[1]

[1] Cf. p. 190 ff.

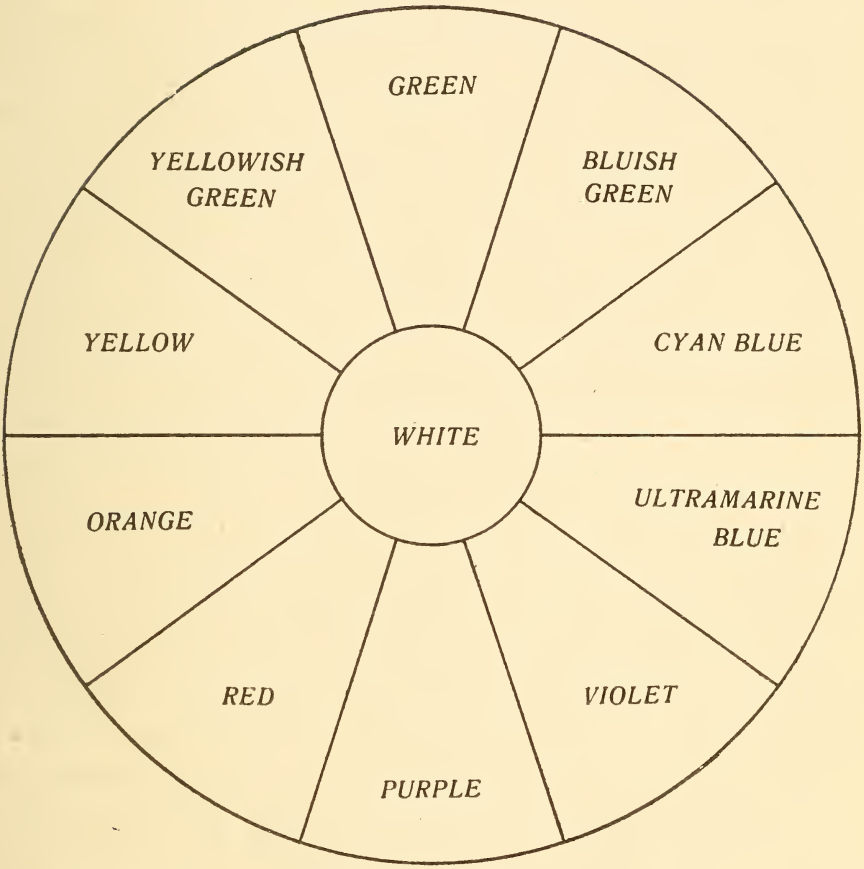


Fig. 9

Diagram Showing Complementary Colors in Opposite Sections

Synæsthesia. A closer relation of sensations, such as we find in persons for whom a sound, for example, will call up a color (photism), or a color call up a sound (phonism), is designated *synæsthesia*. Synæsthesia appears variously. In the case of a student, different words appeared to him in different colors. *Monday*, e. g., appeared green. In another subject, which has been reported, sounds and smells are yellow, excepting thunder, which is black. With her and two sisters,[1] also subjects of synæsthesia, the letters of the alphabet, days, months, some proper names, etc., had each its color. This cannot be explained by ordinary associations, but points to an organic or functional relationship, as we have already seen. It may be taken even to substantiate the view that different sensations are simply differentiations of a simple original and homogeneous sensation, which we must accept along with the theory of evolution. For the lower the animal life, the fewer and simpler the sense-organs; until a point is reached, as in the amœba, where no traces even of any differentiated sense-organs can be seen. The sensation here, as well as the original sensation of primeval life, is not any one of our senses, but, for us, some incomprehensible sensation—"one palpitating homogeneous mass of consciousness, with no breach of continuity of kind or number, but simply expanding and contracting in intensity," as Professor Dewey describes it, from which all the present sensations have been derived.[2]

[1] It is an interesing fact, as Galton has pointed out in his *Inquiries into Human Faculty* that synæsthesia has a hereditary tendency.

[2] *Psychology*, New York, 1892, p. 34.

Intensity and Quality of Sensations. Different sensations are distinguished not only by their quality, but also by their intensity. A sensation, e. g., a sound of a fixed quality may become louder or softer, varying between the lowest limit of perceptible intensity to that of the highest. When a sensation is of the lowest perceptible intensity, it is said to have threshold or liminal value. If the stimulus is decreased, the sensation will disappear entirely.

Measurement of Sensations. The intensity of sensations cannot be measured by a fixed standard as we can measure physical phenomena. Extension, volume, and weight are measured by arbitrary, fixed measures, such as the meter, liter, and gram; electrical force, resistance, strength, and quantity are expressed in measures of volts, ohms, ampères, coulombs, etc. However, it is impossible to devise and apply a unit of measure of sensation. All that can be said of sensations, besides differences in quality, is that one is greater or smaller than another, or of the same intensity. The degree of likeness or difference in intensity is expressed entirely by comparison. We can only say, e. g., that the report of a cannon is very much louder than that of a pistol, or that the moon is much paler than the sun.

Personal Element. If physical stimuli of a given intensity always produced sensations of a constant intensity, we could fix upon a certain one as the unit or standard of measurement, but that is by no means the case. The light that seems moderate to one person, may be painfully intense to another whose eyes are more sensitive. The sound-vibrations that at one time arouse a normal sensation, at another may be felt as intolerably

intense—all depending, on the one hand, on the condition of the nervous system, known as its sensibility. Naturally this condition is ever varying more or less with the changes of nervous energy, fatigue, and nutrition of the individual. On the other hand, what impression a certain stimulus will produce, depends, in a great measure, on the other stimuli that occur at the same time or immediately before. The stars and northern lights that shine and gleam in the darkness, fade with the approach of dawn. In the night sounds reach our ears that cannot be heard in the noisier part of day. We hear every stirring wind, the ticking of our watches, the drilling even of the worm in the beams of the wall, while in the din of the mill or the roar of the cataract we scarce can hear any other sound.

Weber's Law. The law involved in facts of this kind, accurately determined experimentally, was first formulated by E. H. Weber. It declared that in order to produce a just perceptible increase of sensation, the increase of stimulus must be a constant proportion of the stimulus. The proportion is different for the various kinds of sensations and their stimuli, and holds only between certain limits. After a certain intensity in sensation has been reached, a much greater increase of stimulus is necessary to produce a perceptible increase of sensation, and finally, when sensation is the strongest possible, no increase in stimulus, however great, will cause a greater intensity of sensation. Weber, in conducting experiments in sensations of pressure, placed a weight upon the hand. He found that this weight had to be increased by one third before a difference of pressure was felt. If, however, the hand was raised with the weight on it, as we do

in hefting, he found that the weight had to be increased by only one seventeenth. Numerous experiments seem to show that in sensations of pressure, warmth, and sound, an increase of one third of the original stimulus is necessary to produce a perceptible increase of sensation; in muscular sensation, one seventeenth; and in light, one hundredth.[1] Fechner reformulated the law—which he himself called "Weber's Law"—saying that the sensation varies as the logarithm of the stimulus. However, this formulation has not been satisfactory to all psychologists.

Interpretations of Weber's Law. Weber's law admits of three different interpretations, known as the physiological, psycho-physical, and psychological explanations. The first of these is, that the law expresses the relation that obtains between the objective stimulus and the nervous action, which means that the physical stimulus increases more rapidly than the nerve-action, yet that the sensation varies directly as the neural change. The psycho-physical interpretation holds that the law expresses the proportion of the nervous action to the mental changes, and not the proportion between stimulus and the nervous activity. The psychological explanation maintains that the law merely expresses the discriminative power of the mind in relation to the apperceived sensations.

Relation of Intensity and Quality. But the intensity of sensation, furthermore, stands in intimate relation with the quality of sensations, with pleasure-pain, and with perception. While, generally, the intensity of a

[1] According to some experiments, as those of Merkel, for passive touch, 1/13; active touch, 1/19; white light, 1/100; red light, 1/14.

sensation may vary without affecting the quality, that is by no means always the case. If warmth be decreased, the resulting sensation of cold is different qualitatively. A burning heat differs in quality from a comfortable warmth. The sensation from a faint whiff of musk differs from the sensation when smelling it directly from the bottle.

Intensity and Pleasure-Pain. The intensity of sensation has direct relation to pleasure-pain. A stimulus that arouses a pleasant sensation when of a moderate intensity, may be unpleasant or painful when very intense or weak. A sensation near the threshold is, as a rule, an irritating one. A slight touch is ticklish; a scarcely audible sound, or scarcely visible object is exasperating, perhaps because of the uncertainty in which it leaves the mind. An increase of the sensation—if its quality is not unpleasant—changes the pain to pleasure, which increases until an intensity is reached, where the pleasure diminishes till it is changed to pain again. Thus intense light and sound are painful. The sensations that are disagreeable when of medium intensity, form an exception to the rule that sensations near the threshold are painful. A smell or taste disagreeable when of moderate intensity, is very often pleasant when quite weak.

Intensity of Sensation, and Knowledge. Finally, the cognitive aspect is affected by the intensity of the sensation. Sensations have been called the elements of knowledge, because through them we are acquainted definitely with the world outside of us. But sensations also have an affective phase, the tone of which, as we shall see, may be pain or pleasure. Now the more intense the sensation, after a certain point, the greater the feeling of pleasure

or pain, but the less the cognition. As our "coolest" thinking is liable to be the most logical, so the "coolest" sensation is apt to permit the most exact perception. We seem to be able to follow the thought of the speaker more easily when he is using moderate tones than when he is shouting his words. This, in part, explains the tendency to abandon intense colors in dress and paintings and buildings. For being relieved of the color-effects, consciousness may attend more completely to the outlines and meaning.

Local Signs. All sensations, especially those of touch, possess a quality that serves as an indication where our body was stimulated. With regard to the sensations of smell and taste, we locate them in the nose and mouth. The local sign is not so pronounced with regard to hearing; i. e., we do not have such a definite sensation of location in the body as we do of location of the external stimuli. Local signs are especially definite from stimulations of the skin, muscles, and joints. We know what muscle or joint is moved. We know just where the skin itches or is touched. E. H. Weber was the first to determine experimentally the discriminating sense of location of the different areas of the skin. The problem was how far apart must two points touching the skin be in order to be felt as two points. He took a pair of blunted compasses and gently applied the points to the skin or tongue, and he found that the minimum distance varied greatly. On the tip of the tongue the separation of the compass points had to be but one mm., while on the middle of the back and upper arm and leg, it had to be sixty-eight mm. Furthermore, the experiments on both sets of limbs showed that the discrimination is

acuter in transverse direction than in the longitudinal. Other variations were noticed that are explained on the assumption of oblong "sensation circles" extending over the whole body. Each circle was supposed to be the area in which there was a single nerve-fiber, and if the points of the compass touched only one area, they would be felt as one point. But subsequent experiments have shown that practice reduces the sensation circles considerably.

Characteristic of Sensation—Spatiality and Externality. It is the distinguishing characteristic of sensation to have reference to the world lying outside of consciousness. In this respect it stands in marked contrast to other forms of mental experiences, such as feeling, willing, and thinking. The sound we hear is referred to an outward source, while the pleasure which the sound occasions, is more likely to be felt as my own and within me. I *will* to move the pen in my fingers. The movements that I see and the muscular, joint, and contact-sensations that I feel, are localized somewhere before me and outside of the mind, while it is *I*, my innermost self that wills. In short, all sensations, at least the pronounced ones, contain the sense of the spatial and external.[1]

Volume. Various sensations also yield an impression of volume, to a certain extent. This is true, not only of touch, but of sensations of hearing and sight. A loud, low sound is palpably big, while the high sound is small. The sound of some grass-insect that I have heard, was so exceedingly high and piercing as to remind me of a very fine wire or needle. The luminous portion of the new

[1] Cf. James, Stumpf, Ward.

moon appears to have a much larger radius than that of the portion faintly illumined by earth-shine. An object, e. g., a door-knob, or a sheet of paper, seems smaller when viewed with one eye than with both eyes, as was pointed out by Hyslop.

Hence, it is through sensation that the idea of an objective world arises, or as we commonly put it, it is through sensation that we know the world. Any object is for us the sum of the sensations which we have in respect to it. Without sensations, so far as we can understand, the world would be absolutely non-existent for us.

Sensations without External Stimuli. Sensations may occur at times, in a healthy mind, and frequently in a diseased one, without external stimuli. The insane hear sounds and see lights; they smell odors and have tastes that probably exist entirely in their minds, i. e., exist without being stimulated externally to the brain. It is these sensations, undoubtedly, that are the nucleus, so to speak, of many illusions and hallucinations, which afflict the insane. A certain patient coming under my observation thought that his chair and furniture and food had been charged with electricity. He complained of the foul smelling and tasting substances that he thought had been mixed into his food, etc.

How Objects produce Sensation. How objects are able to bring about sensations, is an old problem of philosophy. The earliest view deserving attention—that of Democritus—was that all objects are continually sending forth effluences or exact images of themselves, which entering the sense-organs are there perceived as they really are. The common-sense view, similar to that of Democritus, believes that we somehow look directly

upon objects and see them as they are. The other view, which came to the front, especially through "modern criticism," is that the physical world reacting on the sense-organs and the brain arouses in the mind a unique thing, viz., sensation. The sensation is anything but a copy of the external quality. Science has been able to determine the nature of many of the physical stimuli. Thus physical sound, light, and heat are found to be various kinds of vibrations. But whatever the activities of an object may be, they are able to affect the periphery so that sensory stimuli proceed to the cortex of the brain. What the exact nature of an afferent stimulus is, is largely a hypothetical matter,[1] but it probably consists of neurone-discharge that proceeds to the cortex. How neurone-discharge finally results in consciousness, will, undoubtedly, remain a mystery, yet this much is certain, that the discharge *is* not consciousness, nor is *converted* into consciousness.

[1] "The physiologists have been struggling for fifty years or more to gain an insight into the nature of what they call nerve-impulses, by which is to be understood the occurrences inside axones—for example, at the time when we have good reason to believe that they are functionally extraordinarily active. Their efforts have supplied us with a multitude of data, physical and chemical, interesting enough, no doubt, but which can serve as only the barest prolegomena to an explanation of the essence of the occurrences. If we are so badly informed concerning these elementary and fundamental phenomena we may very well be content to be modest for some time to come in our claims as regards a physiological psychology."—Barker, *The Nervous System*, 1899, p. 249.

CHAPTER X

FUSION AND DISCRIMINATION

Divisibility of the World. To common-sense the world about us seems composed, not only of many objects, but each object of many parts; and when the thought is followed out, we come to the same conception as that held by Anaxagoras, or better, Democritus, the first important expositor of atomism. The matter; of which things are composed, is divisible and re-divisible until we get to the atom, the ultimate indivisible.[1] Furthermore, physics clearly demonstrates that this divisible world is impressed upon the senses by means of various kinds of vibrations of sufficient number and intensity. For example, one or even thirty vibrations per second of a tuning-fork cannot be heard, yet if there are thirty-two or more, we hear a sound.

Fusion. The natural conclusion has been that in knowing the world in its various forms and aspects, the mind performs acts of synthesis, fusion, association, or whatever other name may be given to the process. A simple sensation is the result of a multitude of separate and successive vibrations. Not only are the separate vibrations fused into sensation, but the sensations successive, so to speak, in time and space, are fused into

[1] This is not the chemical atom, but the physical, or better, metaphysical. Since the discovery of radium, we read of the disintegration of the atom,—evidently the chemical.

"sensible totals," such as a long sound, or a large ceiling. The parts which make up a thing must be combined, or else we would never know the thing, but simply the component parts. Still more, as will be seen in the chapter on *Perception*, various heterogeneous sense-impressions are fused into objects possessing various qualities and properties. Somewhere and somehow in man there goes on a fusing activity involved in sensation, perception, and knowing. As James says, "psychology must be writ *both* in synthetic and analytic terms." But the synthetic processes that knowing presupposes logically are evidently acts occurring beneath the threshold of consciousness. For at no time are we conscious of any kind of combining or fusing, notwithstanding that nothing is more certain than that fusion does take place. Kant made consciousness itself a synthesis springing out of "a blind yet necessary function of the soul, without which we would have no knowledge, but of which we seldom become conscious even once." [1] Therefore, what fusion that occurs unconsciously is in terms of consciousness, is beyond description. Yet this like all other unconscious processes, as already explained,[2] finds its physiological explanation in brain-processes *sub limine*. The principle of fusion may be stated thus: Impressions occurring together or successively in consciousness produce or tend to produce a mental total.

Things First Known as Wholes. But to speak of fusion at this time is justified on logical rather than psychological grounds, and is, in a sense, putting the cart before the horse. The fact so forcibly presented by

[1] *Kritik*, p. 78. [2] Pp. 26, 67.

James, that we know things as wholes, is, without doubt, true. As stated, we do not consciously fuse vibrations into sensations, nor construct out of small areas, perceived successively, the larger space, nor combine various kinds of sensations experienced in the past with present sensations into external objects. If it were true that we performed acts of combination consciously, it would follow that in our earliest years the landscape would be seen as a more or less detached thing, or the man as eyes, hands, head, fingers, etc., and not as a man; and that with the development of the synthetic faculty, the unitary character of the landscape or man would grow. But exactly the opposite is the plain fact of consciousness. The landscape is seen as one, the orchestral production of fifty or sixty different instruments is heard as an artistic whole, and the older and more discriminating we grow the more details or parts we are able to discern. Only after we have discriminated, however little it may be, can we properly speak of conscious association, or fusion.

Earliest Experience Undiscriminated. The earliest mental experience of the infant must be undifferentiated sensations, meaningless "sensible totals." Although, for the adult, consciousness must have content, i. e., it must be pain, or warmth, or color, or something else; yet for the infant without the power to suppress portions of his mental excitation and to maintain others, as is done in attention, the content of consciousness may be said to be neither pain, nor warmth, nor anything else in particular, and yet be all of them. In other words, the most primary consciousness has undiscriminated content.

Attention and Discrimination. However, as soon as there is attention, which is a singling out of parts of the stream of consciousness, then there is discrimination. It is difficult to conceive attention without some degree of discrimination, and certainly discrimination is invariably of something toward which the mind has turned. Undoubtedly most of us have been in a room in which many different sounds were blended, when suddenly we wondered whether the clock was still going, and we listened for its ticking. Sometimes it takes considerable time to single out this sound, but when the ear has once caught it, it seems quite distinct. As all the sounds were simultaneous and more or less constant, and the mind and ear attentive, it may be asked why there was not the particular discrimination immediately. It is because attention at first occurred without the necessary intellect. Attention is the volitional aspect of consciousness, while discrimination is the intellectual aspect of the same act. Attention intellectualized is discrimination.

Discrimination is Analytic. Discrimination is an analytic process through which the mind knows differences in the world and is enabled to form concepts, as will be explained in another chapter. As involuntary attention is called up by the particular character of the stimulus, so it is the latter that arouses the sense of *this* and *that* or apartness. Objectively, discrimination implies differences in objects, and subjectively, differences and changes in the affections of the mind.

Discrimination comes with Experience. Nothing seems plainer than that the world about us is full of differences in shapes, colors, sounds, etc., and that to have

any consciousness of things at all implies discrimination. The triangle is not the circle; blue is not red; nor is the odor of a rose its color. However, to an infant, or even an older child the matter undoubtedly does not seem so self-evident. The utter inability of a young child to copy the simplest geometrical figure indicates not only a lack of muscular and motor control, but also an absence of adequate discrimination. The impressions on the child are as totals. The whiteness and warmth and flavor of the milk he drinks are all one and not three different qualities. And how many adults are conscious of sweet and sour when drinking lemonade? The rule is that different qualities experienced together remain undiscriminated until experienced apart.

Variableness of Things Help to Discrimination. The great help to discrimination is the variableness of things. Different qualities are in different combinations. The rose we smell is not always red, nor is the rose-red always a rose. Experience teaches that both the color and the odor of any variety of roses are found in different combinations. The scent may be in a perfume bottle and the color on a barn. Or take a piece of iron; it is blue-black and cold. Polished, it becomes bright as silver. In the fire, it turns red and even white-hot. But in these different conditions it is conceived as the same piece of iron. We have here learned, if not before, that the color and temperature are not the metal—we have discriminated, abstracted, in fact have performed a process of conception.

Experimentation Help to Discrimination. For ordinary discrimination the natural changes in nature and

in the common pursuits of life suffice, but for the more accurate scientific purposes, special conditions for observation have to be brought about, in which there are combinations and separations of elements not usually found. This is one great purpose of laboratory experimentation.

Ability to Discriminate. The ability to discriminate varies greatly in different individuals. Of great importance, in this respect, is training of the senses and of attention. One who has never learned to attend thoroughly through the different senses cannot hope to discriminate finely. The scientist Agassiz was wont to let would-be naturalists that placed themselves under his tutelage look at a certain object, e. g., a fish, for days and weeks, until the pupils had noted every relation and peculiarity. It was a lesson in attention and discrimination, the *sine qua non* of the efficient naturalist. Some persons, however, can never learn to discriminate in certain directions. Some have no ear for music, i. e., they can discriminate tones very poorly or not at all, and so their attempts at singing are in monotones. Others are color-blind, either entirely or in part; more common are those to whom red and green look alike. When one is entirely color-blind, he sees all objects in lights and shades only.

Instantaneous Discrimination. It has been a matter of interest to experimenters to determine accurately how many objects or impressions could be grasped mentally at once and together, and the mind still be conscious of their separateness. Four to fifteen short perpendicular lines were displayed for one hundredth of a second, and different persons were asked to state the number dis-

played.[1] The results of these and other experiments show that the average person can discern only four to seven visual impressions instantly. When the objects displayed were letters and formed familiar words, three times as many were discerned as when the letters were not ordered into words. In respect to sound-impressions, experiments performed in Clark University have demonstrated that eight to ten clicks produced in quick succession is the maximum limit of discrimination.

Summary. To sum up, then, mind primarily implies an activity that integrates, or presents impressions as wholes. The physical events or objects may be analyzed as many, and the mental elements as different, yet the impression felt or seen in consciousness is as one. Whatever name be applied to this activity, be it synthesis, fusion, or association, the content of each moment's consciousness is perceived primarily as a totality. The landscape is one, the man is one, the horse and rider are one as much as the centaur is one. Yet this totality is analyzable as soon as the mind perceives differences and parts. This is discrimination, which begins very early in life, and develops according to the nature of the person and his mental application. The mind discriminates whenever it attends with intelligence.

[1] Professor Cattell.

CHAPTER XI

PERCEPTION

Sensation before Perception. From the time that consciousness begins in an individual, he commences to acquire experiences by way of sensations. The first few years of the infant's life are required almost exclusively for experiencing sensations of various kinds, which, so to speak, constitute the raw material of the objective world. And the child is so constituted and, we might add, so limited in mind that at first his interests lie wholly in mere sensations. He delights to touch, see, hear, taste, and handle objects, and to move his limbs, and use his vocal organs, irrespective of their larger significance and value.

Sensations Experienced in Groups—Basis and Meaning of Perception. While there is no systematic effort made, either by the child or those having charge of him, to bring about these elementary experiences in any definite order, yet since the world is one of fixed order and not of chaos, sensations are experienced in certain combinations and relations. Now it is evident that those that are experienced very frequently in more or less fixed relations, in the midst of a mass of changing other sensations, become for consciousness a unity, or object, according to the principle of association, or fusion, as shown in the last chapter. The mind becomes accustomed to find certain sensations together in a group, or object,

so that when one or more of this group is experienced, the others are more or less instantaneously and spontaneously supplied in imagination, and this process is called *perception*. Take any object,—a rubber ball, for instance, that has become perfectly familiar to the child. He has gotten sensations of form, touch, weight, color, taste, and smell from it, and these are intimately, perhaps for the time inseparably associated in memory. If now the child sees the outline and color of the rubber ball, there are quickly brought up in his mind, by the long associations—by the association-tracts—the other sensations that have been previously experienced with regard to the ball—the child has performed an act of perception. Perception of objects, then, is based upon experience, and the meaning of any perception never exceeds the content of experience, which is the various sensations associated together.

Attributes of Perceived Objects. To all objects perceived we unconsciously attribute *externality*—the objects are outside and not in consciousness merely; *spatial position*—they are in a fixed or changing relation to each other and to ourselves; *extension* and *number*—they are large, small, long, short, one or many, etc.; *quality*—they have inhering in them sensuous characteristics, as color, sound, weight. How it is that we attribute these characters to things rather than feel them as states of consciousness, forms an important part of philosophical and psychological discussion, especially the matter of externality.

Origin of Perception of Externality. Since sensations are peculiar experiences lying wholly within the mind, or are forms of consciousness, how is it possible to explain

the fact that sensations, either alone or fused together into complexes, are felt or known immediately as external to the mind? Two opposing views have been held. One is that the mind through inherent, native power simply perceives things as spatial and external. This is the *nativistic* view. The opposing view is that of the empiricist, who maintains that everything about objects in perception is attained through experience. A middle view is that perception of externality is possible through a native power of the mind, but that only through empirical methods does definite and actual perception come about. Months are necessary before the child perceives at all, and many years to make perceptions definite and comparatively accurate. Perception, in man, is a development in every way, and not a finished accomplishment, as it seems to be in some forms of animal life. The young prairie chicken but a few days old is able to run through a corn-field, or underbrush, and skillfully avoid coming in contact with objects in its way. Here is something like a native perception, not only of externality but of objects as such and their space relations. This, however, is probably an inherited neuromuscular adjustment.

Complexity of Perception—1. Sensation; 2. Association; 3. Attention; 4. Interpretation. An act of perception, then, is not a simple one, but involves, more or less, the whole mind in complex and varied activities. First, as we have seen, there must be direct and original experience by the senses. Sensations as such have reference, as it were, to an external world, and they contain, to some extent, the spatial element. Then by a synthetic process, or association, of which we are not

conscious in the least, the disconnected sense-impressions are fused together into very numerous sensation-groups, which when reëxperienced, as they are in perception, become for us the objects of the world. Into these fused sensation-groups enter a great many kinds and shades of sensations, and upon these depends the accuracy of perception. Furthermore, as perception occurs only on the fresh occurrence of one or more sensations, to become aware of these, consciousness must be turned to them, i. e., there must be an act of attention.

Finally, sensations in themselves—and we never experience them in the abstract—are meaningless; therefore, preceding a perception there must be a process of reassociation with a sensation-group, of which the given actual sensations are an element, previously synthetically formed. Or to put it physiologically, sensations experienced together leave tracts in the brain—sensation-groups. A particular sensation tends to run in the same tract; not only that, but it also tends to produce a nerve-discharge along the whole group of tracts, of which it is one. This is the interpretive process in perception.

Illusion and Hallucination. When a particular kind of a sensation has left a tract in various tract-groups, so to speak, there is opportunity for misinterpretation, as the sensation may cause discharge in any one of the many possible tract-groups. Thus illusions arise. Once when a child and away from home, the writer was absolutely positive that he saw a familiar book lying on a stone wall, and yet it turned out to be a wooden block quite unlike, in shape and size, the book that he thought he saw. When there is a nerve-discharge in a group without the actual sensations that usually occasion a

perception or an illusion, but comes from an inner excitation, it is a hallucination. As perceptions possess a certain vividness, so naturally illusions and hallucinations have a character of life-likeness; and it is not to be wondered at, that the persons who are afflicted with them should not be able to recognize their true import. But we shall speak of this later.

Why one Perception rather than Another?—Anticipation and Suggestion. We may now ask why certain sensations call up one sensation-group rather than another. We feel that the great majority of group-discharges are valid perceptions (i. e., for practical purposes), and that it is only the exception that illusions occur. This, indeed, is the case because in most instances the surroundings are such that we may anticipate the perceptions in general, and the actual sensations are so explicit in character and combination that they can fit into only a limited number of sensation-groups. But at times our anticipations are not induced by the immediate surroundings. Our minds may be full of some idea, as, for instance, when hunting for game or some lost article. Every stirring leaf startles us into seeing a quail, e. g.; or every pebble or straw into a vivid image of the lost ring. Holding a mental image before us in anticipation helps greatly to perceive more quickly the sought-for object; but, on the other hand, it lays us open also to illusion. Professor Münsterberg has found, e. g., that by displaying the word "part" for a very brief time and suggesting the word "future" to the observer, the exposed word will be read as "past"; "fright" will be read as "fruit," if "vegetable" is suggested. That we shall find what we seek, is true in two senses.

Suggestion plays an important rôle in the course of perception. Undoubtedly we all have been impressed, at times, with the fact that much escapes our notice in looking at an object, a landscape, or work of art, until the various details are pointed out to us. After the attention has been directed in certain ways, all is apparent enough. To what extent suggestion may direct not only perception, but the whole mind, will be seen under the proper topic.[1]

Mood. Perception is often determined by the mood in which one happens to be. That love is blind, is as literally true as that fear and discouragement magnify difficulties. The following passage from *Resurrection* by Tolstoy, that master delineator of the human soul, illustrates the point.

"Nekhlúdoff had come here in order to distract his thoughts, for he used to like being in this house, both because its refined luxury had a pleasant effect on him and because of the atmosphere of tender flattery that unobtrusively surrounded him. But today everything in the house was repulsive to him—everything: beginning with the doorkeeper, the broad staircase, the flowers, the footman, the table decorations, up to Missy herself, who today seemed unattractive and affected. Kólosoff's self-assured, trivial tone of liberalism was unpleasant, as was also the sensual, self-satisfied, bull-like appearance of old Korchágin, and the French phrases of Katerína Alexéevna, the Slavophil. The constrained looks of the governess and the student were unpleasant, too, but most unpleasant of all was the pronoun *him* that Missy had used. Nekhlúdoff had long been wavering be-

[1] Chapter XVIII.

tween two ways of regarding Missy; sometimes he looked at her as if by moonlight, and could see in her nothing but what was beautiful, fresh, pretty, clever, and natural; then suddenly, as if the bright sun shone on her, he saw her defects and could not help seeing them. This was such a day for him. Today he saw all the wrinkles of her face, knew which of her teeth were false, saw the way her hair was crimped, the sharpness of her elbows, and, above all, how large her thumb-nail was, and how like her father's."

Fortuity. In many instances, perception apparently takes a fortuitous course, and we cannot say why a particular tract-group is affected. For instance, Figure 10 may be perceived in three different ways: as a flat surface marked with lines; as a sort of a rectangular shaft into which we are looking; or as a solid pyramid with the apex cut off. The next drawing (Fig. 11) may be seen as six cubes, but after looking steadily at a point in the middle for a little while, seven cubes will appear.

Importance of Interpretative Process. The value, then, of perception depends wholly on the accuracy of the interpretative process; and it is apparent that considerable allowance must be made in testimony of personal observation in the occurrences of life, especially as regards the details. Even excluding dishonesty and errors of memory, the grossest discrepancies in the evidence of witnesses may continually be met with in the courts of justice. In fact, were the witnesses to agree in every detail, the court could safely assume that there had been collusion on their part.

Perceptive Value of Various Senses—Taste and Smell—Hearing—Localization. Perceptions come to us through

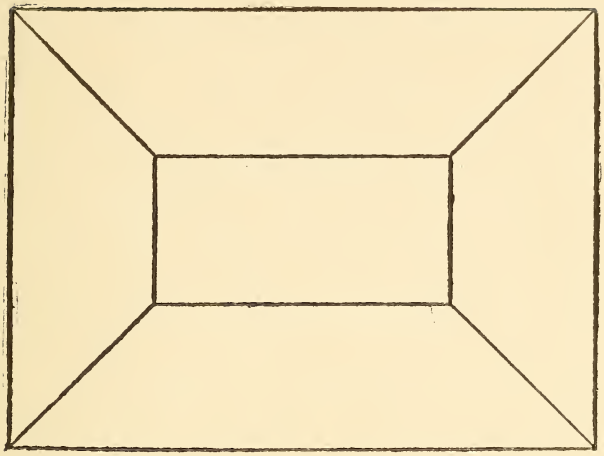


Fig. 10

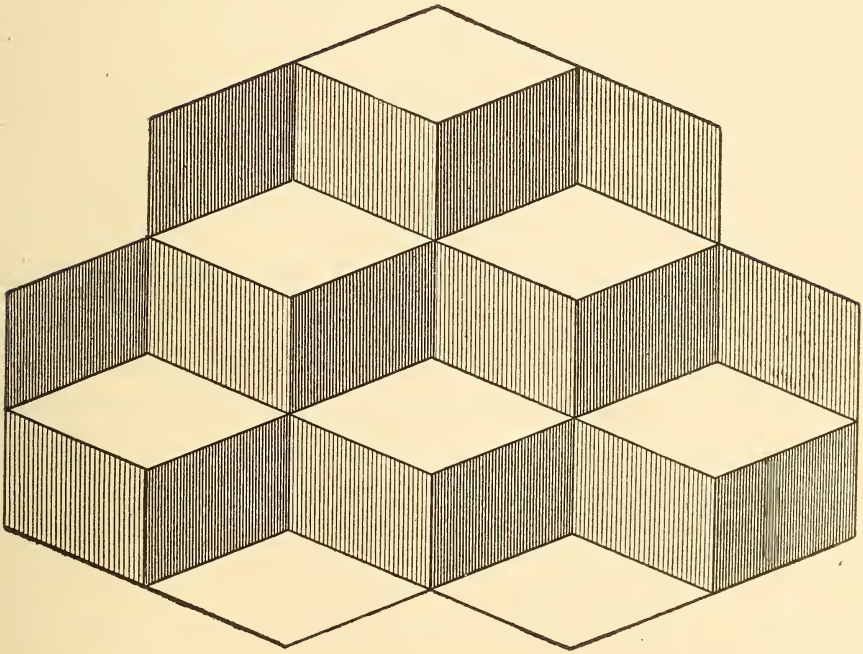


Fig. 11

all the senses, but some sensations have greater perceptive value than others. Taste and smell do not give us any information as to the size and shape of objects, although the latter sense, in the savage and some animals, on account of its great keenness, is far more important in giving information than in the civilized man. Hearing not only gives perceptions of objects, but also, to a certain extent, of distance and direction of the sound-producing object. How is this done? Various views regarding sound-localization may be met with. One view (that of Stumpf) is that auditory sensations coming through one ear are slightly different from those coming through the other, and it is because of this difference that localization is possible. Another view (Preyer's) is that in hearing space-sensations occur in the semicircular canals of the ears. A third view is that direction is determined by the distribution, so to speak, of the intensity of the sound in both ears. If the intensity in both ears is in a certain customary proportion, the sound-waves are interpreted as coming from either the front or from behind. If either the right or the left ear is affected more, the sound is judged as coming from respectively the right or the left. Still another theory is that advanced by Professor Münsterberg, according to which sound-localization comes from sensations of sound and sensations of movement, either actual or incipient, of the head toward the sound-producing body. Facts point strongly to the truth of Münsterberg's contention, especially those brought to light by the experiments with the rotating chair. Very briefly stated: If a person seated in a rotating chair be rotated, sensations of movement, such as are felt in dizziness, will arise, both while rotating and

immediately after. Now it is found that sounds reaching the ear will invariably be misplaced in the direction of the compensatory impulses to movements of the head.[1]

Distance is judged by the distinctness of the sound. The less distinct the sound and the fewer the overtones the farther the object from which the sound-waves emanate. The ventriloquist produces illusions in the hearer by accurate imitation of sounds, generally combined with suggestion, as they strike the ear from different places and distances. Ventriloquism is analogous to painting, and might be called sound-painting.

Touch. Touch, including the sensations of the skin, muscles, and joints, is the sense through which objects are especially perceived as external, spatial, and substantial. By means of the "local signs" we learn to discriminate the parts of the body, and later to orient the body and objects at large. Through this we are enabled to locate above, below, before, behind, to this and that side. Through the joints and muscles we perceive the movements and position of the various members of the body, and are enabled to realize more thoroughly the spatial relation of objects to the body. Our units of measure, such as span, foot, and pace, are significant. We realize a mile after we have walked it. The height of objects is measured by movement of the eyes and head. In a sense, spaces and sizes are only realized and understood in terms of our body and its capacity for movement and endurance. The objects of our childhood—tables, chairs, rooms, trees, little hills and valleys, our parents—all seem very much larger than they do after we are grown up. Through the skin we get percep-

[1] *Psychological Review*, I, 472.

tions of temperature, and of smoothness and roughness. Muscular effort, combined with pressure in the joints, tension of the skin, respiration, and circulation of the blood, gives us the perception of weight and resistance —in short, of substance.

An illusion of touch may be produced by crossing the third and fourth fingers and rolling a pea between them. It will seem like two peas. Another illusion of touch may be brought about by holding a stick by one end and "feeling" about with the other end on some irregular surface, after having closed the eyes. It will seem as though the sense of touch had been transferred to the end of the stick. This feeling of extension of sensation may explain the fact that by wearing clothes we extend and enlarge the feeling of self, as Lotze pointed out is the case. A *grand* lady of necessity wears a long train and elaborate headdress, etc.

Sight. Sight is by far the most interesting sense, although not as fundamental as touch. Through sight we originally perceive light, color, and outline, and to a limited degree, extension. However, we learn to perceive by sight vastly more, so that it need be no surprise to any one to find Bishop Berkeley speaking of sight as the "divine visual language." Visual sensations gain great significance by associations with sensations of touch. After sufficient experience, we can perceive surface, size, solidity, and distance, by means of the eyes. But the use of the eyes involves more elements than mere vision. They are the following:

1. The retina of the eyes. On this we have a perfect diminutive image of the object viewed in light, color, and outline. The fainter the light, shade, and color, and the

less detail and distinctness (aërial perspective), and the smaller the visual image of the object of known size, the farther we judge the object to be. This latter fact is the basis of isometrical perspective. Furthermore, objects at a great distance have what is by painters called "atmosphere," which serves as a sign of distance. The tourist, unaccustomed to the sight, greatly underestimates the distance of mountains on a clear day, because on account of their unusual size and prominent features, they stand out distinct and great in spite of their distance. On the other hand, objects seen in a fog seem much magnified because of their indistinct appearance.

2. Two eyes converging on a common object. This really gives us two different images of the same object from two slightly different points of view, and this yields a limited perception of solidity. Furthermore, the farther the object viewed the more parallel are the axes of the eyes. From their relative position, distance may be perceived.

3. The lenses of the eyes. Clear vision is gained by properly adjusting the lenses; the nearer the object that is viewed the more convex the lenses must be fixed and the more strained the ciliary muscles—another sign of distance. We speak of the "far away look" of the eyes, and this is no figure of speech.

4. The mobility of the eyes in the sockets. Both eyes may be turned so as to view spaces far greater than the field of vision. The larger the object, the more necessary it is to move the eyes (and perhaps the head), the distance remaining the same. When the eyeballs remain at rest, and yet there is a change of imagery on the retina, we judge that we are moving, as in a railway car. An in-

teresting illusion is that of the "haunted swing." Seated in a stationary swing, which is in a movable room, all the peculiar sensations from the forward and backward vibrations of a swing are produced simply by moving the room with all its furniture, except the swing.[1] Slight involuntary movement of the eyeballs also produces the illusion of movement of the whole body, or of the scene before us. Lateral movement of the eyes is more easily accomplished than the perpendicular. This explains the fact that a perfect square seems higher than it does broad. The eyes tend to move along in the direction begun. This explains why two equally long lines, *A* and *B*, forked at the ends, seem of unequal length (Fig. 12). *A* looks shorter because the movement is checked by the inturned lines. This perhaps also accounts for the curved appearance of the lines *C C* and *D D*, in Figure 13.

All Perceptions Illusory. As the word is understood ordinarily, illusion is the exception and valid perception the rule, but considered more critically, the number of illusions increases to a remarkable extent. Even the ancient skeptics, notably Timon and Ænesidemus, held that the senses cannot be trusted. They taught that no perceptions give us a knowledge of things as they are, but as they affect our intelligence and senses. The differences in organization of sensible beings have for their natural consequence different impressions by the same objects. Different senses in the same individual may produce contrary impressions. An object may please through one sense and disgust through another. An object seen at different distances seems to be of different

[1] Cf. *Psychological Review*, III, 277.

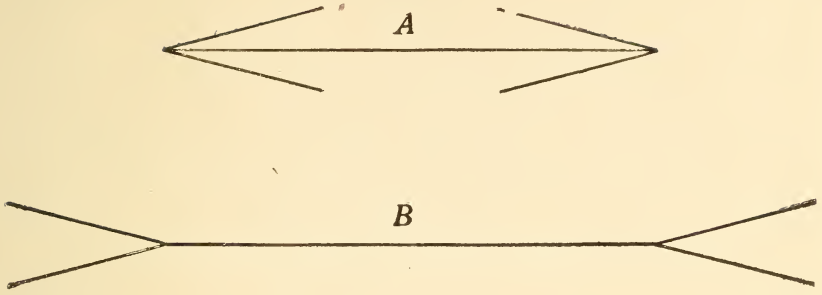


Fig. 12

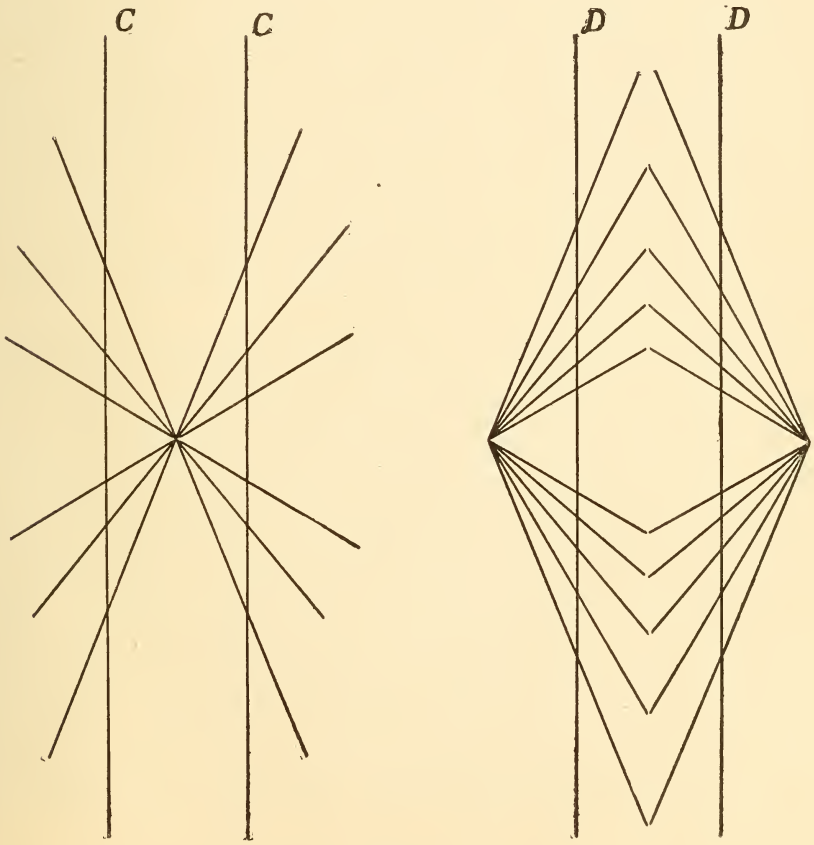


Fig. 13

sizes and appearances. Qualities often differ according to quantities, e. g., the horn of a goat is black, but detached fragments are whitish, etc. Time has not improved the matter. Modern science and thought have shown the impossibility of qualities, as we know them, residing in objects. Light, color, heat, and the other qualities are mental impressions from various kinds of vibrations; what the things-in-themselves are cannot be known, as Kant has pointed out years ago. Lotze remarked later: "The whole of our apprehension of the world is one great and continued deception." Höffding says that "perception is an attempt to explain." [1] Making the standard of right perception a knowledge of things as they actually are aside from our impressions of them, all perceptions are illusory. But the purpose, evidently, is not to give knowledge of things as they are in themselves, but of things for practical ends. It is on this basis, roughly speaking, that right perception is distinguished from illusion.

Voluntary Illusions. Certain perceptions, illusions though they be, are cultivated, so to speak, to serve the end of pleasure and satisfaction of the æsthetic nature of man. The painting on the canvas is meant to produce illusion, and the more complete the illusion the better the work of art. Who would have that "enchantment" dispelled that "distance lends . . . to the view?" The scientist pays the price for his deeper insight into things by the loss of the child-like way of seeing the world, and the departure of faith and poetry and romance, unless at the same time he diligently cultivates the "spirit of things."

[1] *Psychologie*, Leipzig, 1893, p. 283.

Hallucinations, Proper and Pseudo. Hallucinations, as already explained, are mental images with all the characteristics of normal perception yet lacking the usual objective stimulus. Though the excitations are probably in the brain-centers, there may be some occasioned peripherally. Hallucinations are of two kinds: hallucinations proper, which on account of their great vividness and objectiveness are believed by the subject to be perceptions of real things; and pseudo-hallucinations, which, although vivid and life-like, are felt to be unreal, yet may be regarded by the persons having them as signs. The latter is the case in visions and revelations. However, hallucinations proper are frequently regarded as revelations. Examples, even such as are a familiar part of history, are numerous. While Luther, confined in his room on the Wartburg, was translating the Bible, the devil appeared to him, at whom then the reformer hurled his ink-well. Joan of Arc had vision upon vision accompanied by auditory hallucinations. Mohammed had frequent visions as well as epileptic fits. He claimed to be a messenger of God and believed himself to have interviews with the angel Gabriel. Plutarch relates of Marcus Brutus that, just before leaving Asia, he was sitting in his tent alone by a dim light, while the whole army lay in sleep and silence; and as the general was thus seated and wrapped in meditation, he thought he perceived something enter his tent. Turning toward the door he saw a horrible and monstrous specter standing silently by his side. "What art thou?" he boldly said; "Art thou god or man? And what is thy business with me?" The specter answered, "I am thy evil genius, Brutus! Thou wilt see me at Philippi." To this Brutus replied calmly,

"I'll meet thee there." When the apparition was gone, he called his servants, who told him that they had neither heard any noise nor seen any vision.

Some persons are able to produce pseudo-hallucinations at will. Thus Goethe, by closing his eyes and inclining his head forward, could bring up the image of a flower, out of which other flowers ever developed as long as he chose.

CHAPTER XII

UNEXPLAINED MENTAL PHENOMENA

The usual manner in which sense-impressions come to the mind is through the channels of the sensory nerves. In view of certain facts, which will be presented below, the question may here be raised as to whether the human mind can or ever does have real perception through extra sense-avenues.

Psychic Phenomena. From time immemorial stories have circulated of dreams, visions, ghosts, and presentiments, to which, in many instances, there was striking coincidence in the actual occurrences of life. There has been a tendency amongst men of scientific habits and proclivities of thought, to look upon all these reported experiences as manifestations of superstition, self-deception, errors and exaggerations of memory, of diseased imagination, or insane hallucinations, to say nothing of intentional fraud. However, of late years, especially since the founding of the Society for Psychical Research in 1882, the investigation of such matters has enlisted men of scientific training and reputation, and much has been done to throw greatly needed light into a long neglected field of research. Many striking phenomena that have astonished the ever gullible public, have, under the search-light of investigators, been correctly explained on the ground of fraud or hyperæsthesia or thought-forms, or two or all three of these combined.

Various Phenomena Explained. The tricks of showmen are legion. In fraudulent exhibitions designed to prove extraordinary powers of mind of any person, called the percipient, there is often collusion between the percipient and agent. Usually a very ingenious code of signs is prearranged, by means of which the agent can communicate the desired information to the percipient and so mystify the lookers-on. Hyperæsthesia, or oversensitiveness to stimuli, is rarely found in persons of good health in their normal condition, but is common in the somnambulistic and hypnotic states. With eyes firmly closed, the somnambule can walk all around and not run into objects. Hypnotized subjects often manifest almost incredible keenness of the senses, as, e. g., to identify a particular white card shuffled with a score or more of other white cards "just like" the particular card, as the person with ordinary perception would say. "Muscle reading" is possible on the ground of hyperæsthesia of touch and sight in the reader, who notes the infinitesimal muscular adjustments expressive of a particular mental state. Of thought-forms it is to be remarked that persons tend to think in the same directions, and especially where there are similar training, tastes, and occupations, and the same environments, both physical and mental. It is, therefore, no evidence of unusual activities for two intimate friends or relatives to find each other frequently thinking of the same things simultaneously.

Additional Principles of Explanation Needed. But fraud, hyperæsthesia, and thought-forms do not seem to explain all the so-called psychical phenomena. In fact there is a long array of cases collected with the utmost

care, of presentiments, simultaneous dreams, and viridical hallucinations, that, aside from mere coincidence, find their easiest explanation, in the popular sense, in the assumption of a mode of impressing one mind by another not yet determined. However, so unusual from the common course of events are the phenomena illustrative of this principle that the first duty of science is to investigate the data and determine just what are the *facts;* the explanation may then follow. At any rate, the student of psychology ought to have his attention called to the facts as they are known.

The Facts. These phenomena, viz., presentiments, simultaneous dreams, viridical hallucinations, and thought-transference, all have this in common, that, on the one hand, they are purely mental, and, on the other, they singularly coincide with real events. Thus it is said that the presentiment came true; the dream was true, the vision, or apparition, or hallucination, had its objective counterpart; the thought arising in one mind was also in another. Thus Romanes, the English scientist, reported the case of a friend, who saw his grandmother in his sleep in a striking manner, and a few days later the news arrived of her death, which occurred on the same day and at the same hour of the dream. Marshal Serrano, of Madrid, just before dying himself, in 1892, cried out into the silence of the night, "Quick, let an officer of ordinance mount and hasten to Prado; the king is dead!" The next day all Madrid learned with stupefaction of the death of king Alphonso XII, which occurred when he was almost alone at Prado.[1] Max Dessior, the German psychologist, with some friends

[1] V. Flammarion, *The Unknown*, New York, 1902, pp. 366–367.

performed some successful experiments in "thought-transference," in 1885. While Dessior was out of the room some figure was drawn. After returning, with eyes closely bandaged, "I set myself at the table," he writes, "and in many instances placed my hands on the table, and the agent placed his hands on mine; the hands lay quite still on one another. When an image presented itself to my mind, the hands were removed. . . . I took off the bandage and drew my figure." The following (Figures 14–25) are, in part, the results. The experiments recorded by Anton Schmoll [1] and Etienne Mabire, of Paris, were conducted similarly. The percipient, with eyes bandaged, sat in a corner of the room with his back turned to the agents and about ten feet from them. Figures 26–45 represent some of the results.[2]

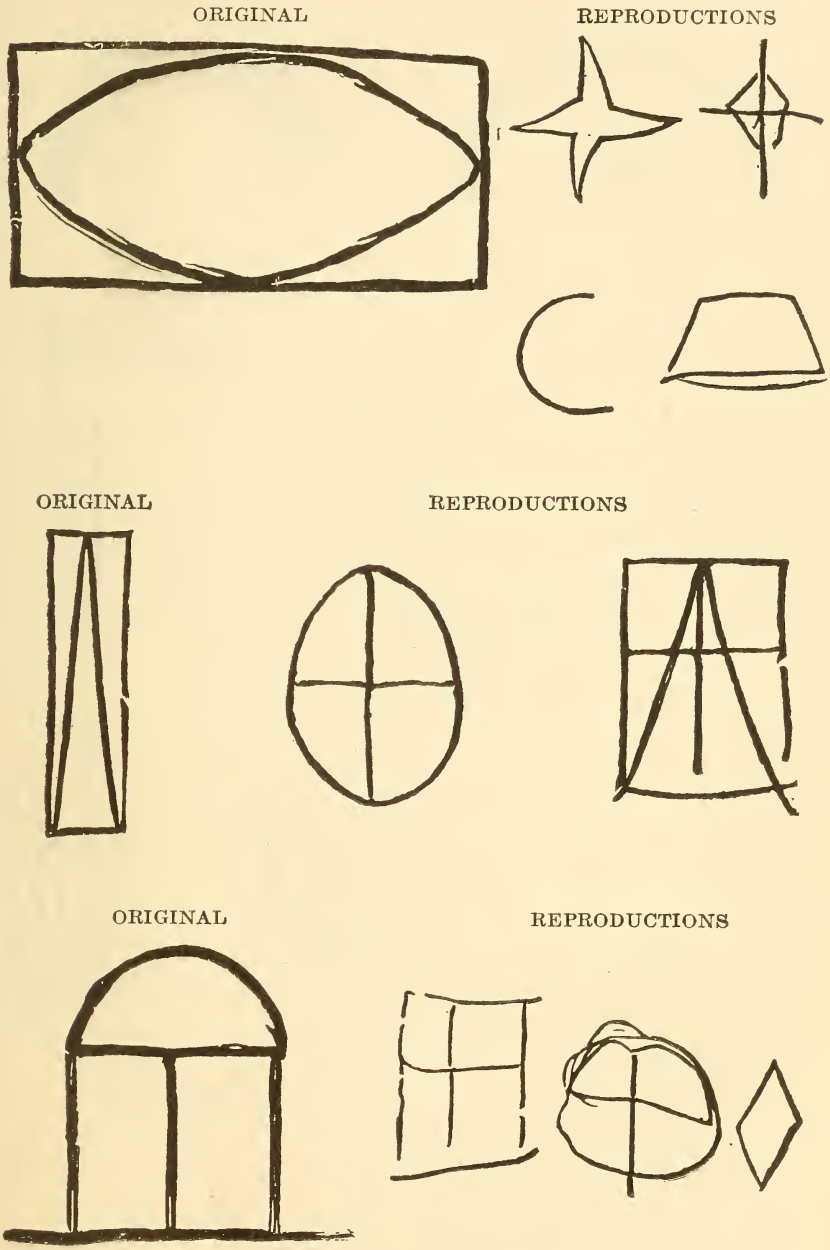
Ludovic X., a child, beginning with his fifth year, was observed to possess remarkable powers. When his mother wished to teach him the multiplication table, she was amazed to find him able to recite it as well as she could herself. In fact, he was able to give the answer forthwith to any mathematical problem known to his mother. If his mother underlined with her nail any word in the book, the child was able to name it without seeing it. He could find any object hidden without his knowledge, guess all the cards in a game, translate foreign languages, etc. In fact, whatever was in his mother's mind, he could perceive.[3]

Thousands of similar cases are on record, and thou-

[1] One of the founders of the Astronomical Society of France.

[2] Cf. *Apparitions and Thought-Transference,* Frank Podmore, M.A., London and New York, 1895.

[3] V. Flammarion, op. cit., p. 294 ff.


ORIGINAL
REPRODUCTIONS
ORIGINAL
REPRODUCTIONS
ORIGINAL
REPRODUCTIONS

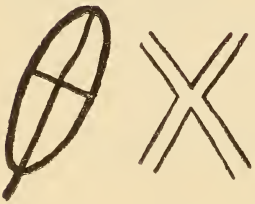
Figs. 14–25

ORIGINAL

REPRODUCTION

ORIGINALS

REPRODUCTIONS

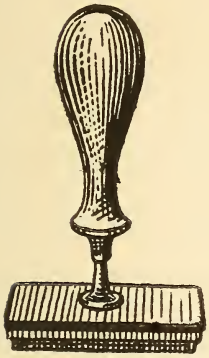


OBJECT

REPRODUCTION

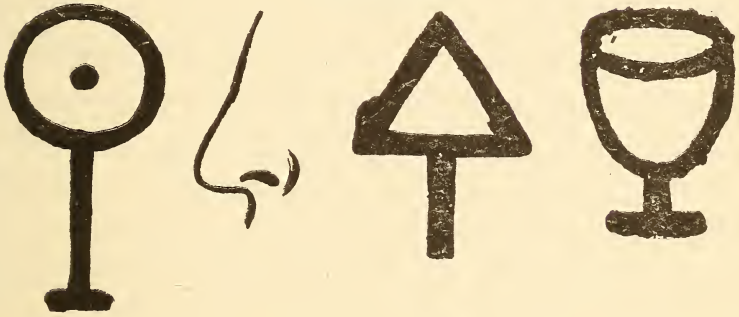
Figs. 26–35

OBJECT

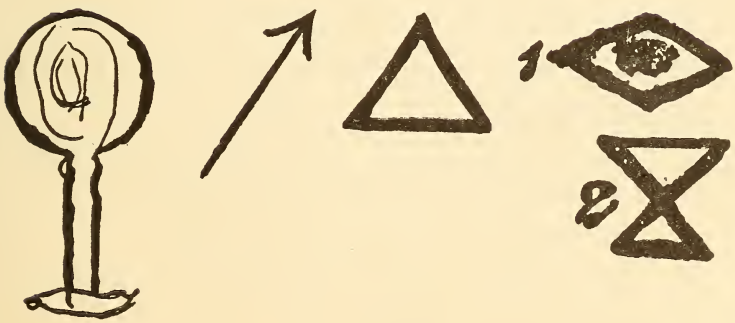


REPRODUCTION

ORIGINALS



REPRODUCTIONS



Figs. 36–45

sands of others that have never reached publicity, constitute, so to speak, the private legends of many families. So numerous are these phenomena from the dawn of history down to the present time, that no psychology is complete without taking note of them, whatever be the principle that explains them, be it self-deception of some sort, or a hidden agency operating upon an equally obscure and undeveloped function of man.

Telepathy not Proved. The principle usually assigned in explanation of all these phenomena, is telepathy—mind acting on mind other than through the known senses, and suggestive of a sort of mental wireless telegraphy. This explanation is simple enough and seems to satisfy many, yet, as a recent psychologist has pointed out,[1] it is one thing to prove that these phenomena are not due to chance, and another to jump, therefore, to the conclusion that telepathy explains all. Undoubtedly there is something to be explained, but it is doubtful, whether the facts containing the clue to the solution have as yet been noted, or whether, at the present stage of knowledge, the clue is discoverable. This much we may confidently look for, that when the facts containing the solution will have been observed, the answer will not be at variance with the sum total of scientific knowledge.

[1] Joseph Jastrow, *Fact and Fable in Psychology*, Boston and New York, 1900, p. 98.

CHAPTER XIII

MEMORY

Memory has Reference to the Past. Consciousness by direct methods knows its own content. When this content, in the form of an idea, or image, is referred to past experience, the consciousness is memory. The act of reference and the idea both belong to the present instant of consciousness, but the experience which the idea means, belongs entirely to the past.

Organic Memory. Frequently two kinds of memory are described, the "organic," and memory proper. By the "organic memory" is meant the power of the nervous system to conserve impressions in the establishment of habits. The only use this extended designation has, is to point out the analogy between these purely physiological facts and memory proper, in the matter of conserving impressions for future use. Yet the similarity between organic memory and memory proper is so striking that we may regard the one as primary and partial, and the other as developed and complete memory.

In this broader sense, memory, the power to conserve impressions, is inherent in all nerve-substance, and may be observed in the simplest forms of life, such as the unicellular organisms. The amœba, a shapeless speck of protoplasm, so small that it must be observed through the microscope, selects its food with practical discrim-

ination, while a grain of sand is thrust back with its pseudopodia. Whence this discrimination? Presumably the tendency of this speck of life was acquired during the ages of existence of its ancestors. The higher the forms of life the more elaborate the organic memories appearing as impulses, tendencies, and instincts that are transmitted from parent to offspring. It is quite wonderful to see with what correctness the little chick, that has just crept out of its shell, acts with regard to its environment. Considered in the light of organic memory, it is not quite so mysterious, even though quite as remarkable.[1]

Memory Proper Defined—1. Retention. Memory, in the usual and proper sense of the word, is the power of the mind to retain, recall, and recognize centrally and peripherally originated impressions. Memory is concerned with impressions, as we may designate all mental experiences, whether they be sensations, perceptions, thoughts, feelings or volitions, that have passed from consciousness. These impressions, in order to be remembered, must, in some way, be *retained*. The retention-aspect of memory is one of which we are never conscious, nevertheless it is a logical demand that we find highly useful in our thoughts about memory. We know by direct experience what an impression is as long as it is in consciousness, but after that it is impossible to form an adequate conception of it and its whereabouts. We may say with Locke and later with Bowne, that ideas are actual only as long as they are in the mind, and

[1] Instructive reading along this line may be found in Ewald Hering's *On Memory*, and Alfred Binet's *The Psychic Life of Micro-Organisms*.

when they are out of it they are nowhere; we can then only speak of revivability of impressions. It is just this revivability, however, on which we seem to need further light, and, therefore, speak of a "retention" of impressions, which may be "revived." The matter is most easily understood if represented in physiological terms, which, no doubt, have their psychological analogues. Impressions are somehow retained as neurone-modifications. For instance, we hear the ringing of a bell. Together with the consciousness there is an impression made in certain portions of the brain. Long after the consciousness of ringing has ceased, there is left in the brain a specific modification, which, under conditions, may serve to "recall" or "revive" to consciousness the image of the original experience.

Degrees of Retention. The conservation of either centrally or peripherally originated impressions, is not constant, nor alike in different persons, but seems to depend upon the tone and quality of the brain-cells. Impressions received when the nerve-centers are fresh and well nourished, are better retained than when the latter are wearied by too many impressions or in an irritated, exhausted condition. The impressions of childhood, after the third or fourth year, and of youth are better conserved than those of middle life, and those of middle life than those of old age. "First impressions" are apt to last. Those of the morning are more lasting than those of later hours. In old age, when memory is declining, or in progressive amnesia, due to disease, the impressions of the earlier years of life remain vivid the longest, while those of the present or the immediate past are lost very quickly. It is for these reasons that we

should devote the early hours of the day to such occupations as require retention of details; and that the early years of our education should be devoted to pure acquirement of knowledge—not to mention the directing of the will and the forming of good taste—rather than to critical and analytical work.

Age of Maximum Memory Power. It is commonly known that memory is strongest in young persons, yet to determine the age when the power is greatest, experimental tests must be made. Auditory memory-tests, e. g., were made [1] on one hundred school children of different ages. The matter to be remembered was a story. The results of these memory tests show that the boys in the third grade remembered only seventeen per cent of the story, while in the second year of the high school they remembered forty-three per cent, which was the highest for boys. The girls remembered eighteen per cent in the third grade, forty-three per cent in the seventh grade, and forty-seven per cent in the high school. Other tests in auditory memory, show that "younger pupils always reproduce the numbers without hesitation, while college students always hesitated and required more time to reproduce the list." [2] Visual memory was found to be stronger in older students than in younger persons.

Basis of Retention. There is abundant material in physiology and pathology to show that retention is directly dependent upon nutrition of the nerve-centers. Fatigue and inadequate food, impairment of the organic functions so that food is not properly changed to

[1] By John C. Shaw, of Clark University.

[2] C. J. Hawkins, Yale University. *Psychological Review*, IV, p. 289ff,

blood, or reduction of nervous tone or impaired nourishment of the nerve-cells, is attended with a proportionate loss of the power to retain impressions. Actual laboratory tests show that, whereas a certain person in a normal condition required one hundred thirty-four seconds to commit to memory a set of eighteen figures, after seventy-two hours of enforced insomnia (sleeplessness) he required nine hundred sixty seconds in one test, while in a third test he failed entirely after having worked at it for twenty minutes. After sleep this same person easily committed the figures to memory in one hundred six seconds.[1]

2. Recall. The second aspect of memory is the power to *recall* impressions to the mind. That this power exists, we know directly in consciousness, on the appearance of ideas referring to past experience; but of the act of recalling, as such, we know nothing whatsoever, although we may be certain that while we speak of "recalling," "reproducing," or "reviving" impressions, the process itself is not an echo or duplicate of the original act of perception or sensation, but is an original act itself.

Memory-Ideas. The idea, too, in memory is not the old impression literally revived or exactly reproduced, as we might revive the wilted plant, or reproduce a silver dollar that a few minutes or hours before had been slipped into our pocket. The idea, or image in memory, while it represents a past experience with more or less fidelity, is in itself a mental fact belonging wholly to the moment in which it occurs in consciousness.

Memory as Imagination. Recalled impressions, in gen-

[1] Experiments by Prof. G. T. W. Patrick and Dr. Allen Gilbert. *Psychological Review*, III, p. 469 ff.

eral, as already stated, are images, in a way, of the original experience. If the impression be one of sight, the recall will take the form of a visual image; if of sound, a sound image, or one of the adjustment and movement of the vocal organs, etc. In other words, memory of the simpler experiences is largely imagination. Yet, as the mind occupies itself more and more with relations and complex affairs, the tendency to employ symbols in thought and in recall in place of images becomes stronger, and there is often a corresponding decline of the power to represent in definite images. However, there are exceptions to this rule. Professor Külpe has made observations upon several persons to determine their power of recollecting in definite color-images, and found that one of them was "absolutely incapable of forming a sensory idea of any colored object. He saw nothing in spite of all his efforts," and yet his visual perception was normal, as was also his process of recognition. "Here then, we have a person who recollects and remembers without memory-images, and has thoughts and ideas without images of imagination." [1]

Perceptions and Memory-Images. We are not able to discriminate as many qualities in memory-images as in sense-perception, yet there is always, in normal reproduction, a difference marked enough to enable us to distinguish memory-images from perceptions. Especially in point of vividness, the image generally falls far below the original impression. The memory of a toothache does not pain, nor the thought of a draught of water allay thirst. As compared with the actual experience, a memory is hollow, vague, and insipid. However, in ab-

[1] *Outlines of Psychology*, London and New York, 1895, § 27, 9.

normal reproduction, as in a state of hypnosis, or in hallucination of the sane or insane, the suggested image is felt as real as life.

Recollection Variable. Just as there is a fluctuation of the power to conserve impressions, so we note that not at all times can we recall impressions with the same facility and precision. There are times when memories crowd themselves upon our notice. Names and faces, reminiscences with all attending emotions and circumstances, and anecdotes, and words with which to give expression to them, present themselves without effort or interruption. At other times all is the reverse. We cannot recall some of the very familiar things. We feel stupid and our speech is unusually prosy, and perhaps even hesitating and faulty. We feel as if sand were in the wheels of our mental machinery, and that which refuses to come to our mind and tongue now, is not lost but will appear some other time.

Basis of Recollection. As retention depends upon nutrition, so recall of impressions seems to depend upon a neurone-activity that also stimulates circulation in the brain. For it is noticed that when reproduction is poorer than usual, the circulation, too, is frequently poorer, and when reproduction is increased, circulation is also. Of course this observation obtains only when the general circulation is the same as the encephalic. In acute fevers, when the circulation is abnormally rapid, memory-images are excessively numerous and vivid. In the patient's delirious states, innumerable fancies and images rush pell-mell through the mind until it is well-nigh exhausted. The maniac, too, who is affected with an exaltation of nervous functions, abounds in a multitude

of pictures and fancies, and so vivid are they often that they are to him as reality. Persons who have been in danger of impending death testify that in an instant their whole life with all its supposedly long forgotten incidents, flashed through their mind in that critical moment. No one knows better than the participants how appropriate is the word "Kaffee-klatsch"—a minor social function of German ladies, in which coffee and "gossip" (klatsch) are indulged in. No wonder that there is a romance of wine, honored in song and poetry from time immemorial; for wine exhilarates and quickens the circulation and thus loosens the tongue and brings the flow of wit and humor at the convivial gathering and the social board! All other stimulants have a similar effect, while sedatives have the opposite. The latter soothe the nerves, and taken in large doses, even retard the circulation. Ribot cites the case of a clergyman who was obliged to discontinue the use of bromide of potassium, because he had very nearly lost his memory, which returned when the medicine was discontinued.[1]

Course of Reproduction. Though the power of reproduction of impressions seems to depend on a nerve-activity directly favoring circulation, we have yet to consider why of the vast number of impressions, this one should be recalled rather than another. This question can never be fully answered, any more than why there should be recall at all.

Various Explanations of Course of Ideas. The course of ideas has always incited the sense of the mysterious and wonderful. The scholastic psychologists held it to be "one of the most difficult secrets of Nature." Various

[1] *Diseases of Memory*, New York, 1882, p. 200.

"laws" have been formulated, which were supposed to account for the order of reproduction. It was Aristotle who first affirmed the relations existing between ideas to be those of *contiguity* of space and time, *similarity*, and *contrast*. Hume substituted *cause and effect* for contrast, while others increased the three to seven, then to ten. In spite of the fact that nearly every psychologist had his own laws, the "laws of association" have gained such importance with the English psychologists as to become their sole psychological creed. Thus J. S. Mill held that the law of association was coördinate with the law of gravitation, the one ruling the psychical world as the other does the physical. But we become suspicious at first glance that these "laws" are not fundamental, however much they may explain, to say nothing of other objections. Then there is the law of redintegration, first announced by St. Augustine: "Objects that have been previously united as parts of a single mental state, tend to recall or suggest one another." This does not account for the fact that objects that have not been in the mind before, frequently suggest others. The theory of Herbart, that of the interaction of ideas on the ground of repulsion and attraction, with which ideas are endowed, is altogether too fanciful for matter-of-fact psychology.

Facts, not Logic, decide the Law. What the "law" governing the succession of ideas is, should be decided by the facts and not by logic.

The Facts. We notice, in the first place, that a series of ideas occurs in which we can plainly detect the outward relation of the ideas. The image of a name suggests that of the thing, and *vice versa*. A horn suggests the idea of a whole ox. *A* suggests *b*, *b* suggests *c*, etc. A single

object, e. g., a tree, recalls the group to which it belonged, the stretches of valley in which it stood, the river emerging from the blue hills beyond, sweeping by fields, woods, farms, and willow-decked bars, and then with a titanic curve disappearing behind the weathered bluffs of chalk. It also recalls *me* the observer and the effect of the view upon my mind. Transport one into joy, and all the world seems to smile. There are then no difficulties. On the other hand, let gloom settle upon him, and what a swarm of black-robed pictures array themselves before his vision! Fill one with fear, and danger lurks on every hand. A fire suggests warmth, and a spark of fire flying into a can of gunpowder an explosion and destruction. The sight of a mouse a few days old may bring up the image of an elephant; and that of a panther, the image of a cat. A sensation or feeling at this time may suggest the Coliseum in Rome, or an omnibus ride in London, or a discourse on the Ethics of Tolstoy.

The Law of Association. It is an easy matter to discover in each of these examples a reason for the recall. It may be said that in one case it is previous association, in another habit, in a third similarity, and so on. The question now is, can we make a formulation that will cover all these and similar cases? We find such a one in the statement that *Impressions that have once been together simultaneously or successively in consciousness, tend to reappear together.* The same fact physiologically stated: Brain-processes that have once been active together simultaneously or successively, tend to propagate their excitement into each other. It is to be noted that it is not the objects that establish liability of reproduction but the effects (impressions) these objects have upon

consciousness. Thus we see why a panther, seen for the first time, may remind us of a cat; it is not because the animals are similar, but because there is partial identity of impressions, i. e., a part of the impression produced by the sight of panther has been in consciousness before when we had the impression of cat.

Secondary Elements in Association. Yet the impressions that have been in consciousness together are many, while in the recall only a few present themselves. Why this particular impression rather than some other? That is determined by secondary facts, viz., vividness and recency of impressions, present mood and interest, familiarity or frequency (repetition) and primacy (standing at the beginning of a series of impressions). It has been determined experimentally [1] that liability to associations due to frequency, or repetition of impressions, is one tenth greater than that due to the vividness or recency of impressions, although in auditory impressions, recency produces a "very striking effect." [2] The fact that an impression stands first in a series of impressions (primacy) is of little significance except in individual cases, or when the primacy is in a short series.

Sporadic Reproduction. But there is still another class of recalls which seem to need special explanation. Often suggestions out of all keeping with the surroundings come, and it may be asked, "What made you think of that?" Frequently we are positive that no conscious train of thought has brought up the idea. These memories, out of all rhyme and reason with our atmosphere

[1] At Wellesley and Harvard. V. Mary W. Calkins' *Association*, New York, 1896.

[2] Op. cit., p. 50.

and conscious occupation, pop into the mind and surprise us with their incongruity. Are these spontaneously originated, as they seem to be, or have we merely forgotten the connecting train of ideas, as is often contended? The author but recently, while looking at some dill-pickles, had flash upon his mind the image of a southern California beach and an incident associated with the scene. The memory came so suddenly and the connecting link was sought for so immediately that a dropping out of a segment of consciousness is altogether improbable, yet he felt that there was a connection somewhere, if it could but be found. And it was found after a little thought. Where the brine on the pickles had dried, there were left fine, white salt crystals, just such as he had seen on kelp and sea-mosses that he had gathered on that beach. The memory in the stream of consciousness was spontaneous, and yet we see how it may come under our law, at least in its physiological version. Now it is a question whether all cases of reproduction direct in consciousness are not really indirect as far as the brain-process is concerned, just like the one given. That there are unconscious brain-processes may be regarded as established beyond a doubt, and though we have reason to suppose that the general nature of unconscious cerebration is the same as that accompanied by consciousness, we yet have no direct evidence against the supposition, that there may be brain-processes independent of and unrelated to other processes immediately preceding, i. e., spontaneously generated processes.

3. Recognition. The third feature in memory is *recognition* of the experience which the idea means. Reproduction without the feeling of familiarity, of

having-known-before, would be mere repetition and not memory.

Recognition of memory-images is not unlike recognition in perception. We meet a person that we have seen before, and we say that we remember or recognize him, or that we do not; we have forgotten. Recognition may or may not accompany perception, but reproduction is generally accompanied by the consciousness of having been aware, on some former occasion, of this particular experience, which the idea means. I say, *generally;* for the fact that we have a reproduction of an experience does not imply that we have an experience of a reproduction, either logically or factually. Macaulay somewhere tells of a gentleman, who in the morning would reproduce in writing as his own, what had been read to him the evening before. Some interesting cases of plagiarism have been cleared up on the ground of reproduction without recognition.

Pseudo-Recognition. Pseudo-recognition—also designated pseudo-memory, and paramnesia—is an illusion of memory. It is a phenomenon opposite to that marked by the absence of recognition. There come to consciousness moments that seem to have been experienced sometime before with precisely the same feelings, content, and circumstances. Paramnesia is quite widespread, being experienced by about thirty out of every one hundred persons, as was found by a French investigator.[1] In some persons it may occur so frequently and include so much of the consciousness, as to appear as a mental disorder. This seems to have been true of a case reported by Dr. Arnold Pick. "An educated man, who

[1] A. Lalande.

seems to have understood his disease, and who himself gave a written description of it, was seized at the age of thirty-two with a singular mental affection. If he was present at a social gathering, if he visited any place whatever, if he met a stranger, the incident, with all the attendant circumstances, appeared so familiar that he was convinced of having received the same impressions before, of having been surrounded by the same persons or the same objects, under the same sky and the same state of the weather. If he undertook any new occupation, he seemed to have gone through with it at some previous time and under the same conditions. The feeling sometimes appeared the same day, at the end of a few moments or hours, sometimes not until the following day, but always with perfect distinctness." [1]

Recognition and Knowing. Recognition, the act of reknowing, is as fundamental as any act of knowing. How we can know that we have known the same things before, is the same kind of a mystery as any fundamental fact. And yet recognition differs from simple knowing in that the former contains the sense of pastness, brought about by the particular character of the neural discharge. This is not only fainter than the original discharge, but its tract is crossed by and blended in its "fringe" with other memory-tracts, so as to form a very complex affair, instead of the "simple idea" it is often wont to be represented. To be sure, sometimes the memory-tracts are so intensely reëxcited as to give the impression of an original excitation, in which case it constitutes a real or pseudo-hallucination.

Recognition, in pseudo-recognition, is probably not

[1] Ribot, *Diseases of Memory*, New York, 1882, p. 188.

unlike valid recognition. To make the matter clear we have but to suppose that impressions are recorded in both hemispheres of the brain, and that in pseudo-recognition, for some retarding cause the impression reaches one hemisphere later than the other and with less intensity.[1] The effect in consciousness is just what we might expect, viz., a distinct impression with the added consciousness of a fainter impression following the other indefinitely in time.

Capacity of Memory. Memory, in different persons, differs both as to capacity and kind, as every one of us has abundant opportunity to observe among friends and acquaintances. Some seem able to remember everything from the trivial things about them to the abstract formulas in infinitesimal calculus; while others are ever conspicuous for what they have forgotten. Napoleon I, his biographers relate, personally received and read all letters directed to him and never forgot their contents. One glance sufficed to fix ineffaceably on his mind for all time the scenes upon which he came. Samuel Johnson, says Boswell, never forgot anything that he either heard or read. Seneca, the philosopher, could repeat forward and backward 2,000 unconnected names after they were read but once. Muretus, the tutor to Montaigne, tells of one of his pupils, a Corsican, who could repeat forward and backward 36,000 unconnected words after one hearing, and could have repeated more had the readers not become exhausted. Joseph Scaliger memorized the whole of Homer in twenty-one days. Although extensive memorizing is not in vogue these days, we still hear of a grandfather occasionally that,

[1] Wigan's theory of the non-synchronous action of the hemispheres.

John Ruskin like, can repeat the English version of the Bible from beginning to end. Helen Keller never forgets the spelling of a word that she has learned to spell.

Kinds of Memory. Memory, too, in different persons is of a special kind. One person has a good memory for sounds; another for colors and forms; and still another for relations, material and logical, etc. An idiotic negro, who has been extensively exhibited throughout the country, is able to reproduce without the least deviation on the piano, any piece of music, however difficult, after hearing it but once. Mozart wrote down "Miserere" after having heard it a second time. It is related by an English writer that a certain man "could remember the day when every person had been buried in the parish for thirty-five years, and could repeat with unvarying accuracy the name and age of the deceased, and the mourners at the funeral. But he was a complete fool. Out of the line of burials he had not one idea, could not give an intelligible reply to a single question, nor be trusted even to feed himself." [1] A certain French painter had such an extraordinary visual memory that he could paint portraits from memory. He would intently fix his eyes on the person sitting for a moment, then dismiss him. After that the painter could vividly see his model sitting there whenever he chose, by only looking at the vacant chair. Others again have such poor visualizing power as not to be able to bring up in the mind a distinct image of the most familiar face.

Experimental study of memory has yielded some very

[1] Quoted from Forbes Winslow's *The Obscure Diseases of the Brain and Disorders of the Mind*, London, 1868, p. 561.

suggestive and interesting data. The results of experiments [1] with regard to a large number of persons, ranging from primary pupils up to and including college students, corroborate the conclusions of other experiments mentioned above (p. 186), viz., that auditory memory in females is developed earlier than in males. Visual word-memory and memory of objects seen seem to be stronger in males. After an intermission of three days, objects seen can be reproduced in memory by males and females, seven times as effectually as words heard.[2]

Differences Accounted for. This difference in memory in different persons is accounted for by the unequal efficiency of the various centers. Visual memory depends principally on the occipital lobes; sound-memory on Wernicke's convolution, etc. When these centers are impaired from some cause or other, there is a corresponding loss of memory (amnesia) besides other functional disturbances. For example, a patient (described by Legroux) troubled with aphasia, after recovery testified that he had forgotten all the vocabulary he knew, yet fully retained his consciousness and willpower. He knew clearly what he wanted to say, yet could not say it. Although he understood perfectly the questions directed to him, no effort on his part to reply enabled him to remember a word.

Forgetting—Hypermnesia. The question is sometimes raised if any impression is ever lost beyond recall. The general experience is that the person with average memory forgets far more than he remembers. John

[1] Conducted by E. A. Kirkpatrick.

[2] *Psychological Review*, I, 602 ff.

Locke says that "ideas in the mind fade, and often vanish quite out of the understanding, leaving no more footsteps or remaining characters of themselves, than shadows do flying over fields of corn. . . . Thus the ideas, as well as children of our youth, often die before us; and our minds represent to us those tombs to which we are approaching; where though the brass and marble remain, yet the inscriptions are effaced by time, and the imagery moulders away. The pictures drawn in our minds are laid in fading colors; and if not sometimes refreshed, vanish and disappear." [1] Yet when we consider the numerous cases of hypermnesia—exaltation of memory—and other pertinent facts, the current view of psychologists, that we irrevocably forget the larger part of our impressions, is made somewhat uncertain. A young woman who could neither read nor write—it is related by Coleridge [2]—in the delirious moments of a fever was heard talking Latin, Greek, and Hebrew, whole pages of which were written down. It was long before any explanation save that of demoniacal possession could be obtained, until her history was traced back, and it was found that as a child she had been charitably cared for and lived in the house of a Protestant clergyman, who used to make a practice of reading aloud from the Greek and Latin Fathers, and from a collection of Rabbinical writings. In these works so many of the passages taken down at the young woman's bedside were identified as to leave no reasonable doubt as to their source. "A case has been related to me," says Dr. Abercrombie, "of a

[1] *Essay Concerning Human Understanding*, Book II, Chap. X, 4–5.

[2] *Biographia Literaria*.

boy, who at the age of four received a fracture of the skull, for which he underwent the operation of trepan. He was at the time in a state of perfect stupor, and after his recovery retained no recollection either of the accident or of the operation. At the age of fifteen, during the delirium of a fever, he gave his mother a correct description of the operation, and the persons who were present at it, with their dress and other minute particulars. He had never been observed to allude to it before, and no means were known by which he could have acquired the circumstances which he mentioned." [1] The author was recently investigating automatic writing by a young woman. He asked what the operas of Wagner were. The young woman, who was cultured and otherwise well informed, confessed that she could not name a single one, but the planchette wrote at one time, "Lohengrin," and a few moments later, "Tannhäuser." It could not name any others except one, and that after being told. These and similar cases show, if nothing more, that under certain excitation or when some portions of the brain work without the processes reaching consciousness, some impressions, of which we know nothing or had long forgotten, make their appearance.

Memorial Integration and the Mythopœic Tendency. There is no absolutely perfect memory, and of the countless impressions coming to the senses, but few become prominent in consciousness; consequently the past reproduced in memory is but a meager and faint picture with fatal gaps here and there. Since the mind does not content itself with images vibrating, as it were, on the threshold of consciousness, imagination spontaneously

[1] Quoted from Ribot, op. cit., p. 180.

and unintentionally brushes up the hardly perceptible lines, it fills up the vacant gaps, and casts over the whole a harmonizing atmosphere and life-likeness. In other words, the mind's eye sees or tends to see things past as well as present in complete wholes and not in fragments. This was pointed out in the chapter on Fusion and Discrimination; this we saw to be the essential factor in perception; and this is also an important element in memory. But the reproduction is not so much a faithful transcript of the past as it is a new creation involuntarily executed. This fact as well as the liability to err in the original perception, should give us an estimate regarding the correctness of original observation and its reproduction from memory, and should serve as a warning against uncritical faith in what we see and hear and remember. Much that is current as historical fact is essentially fable—the product of the mythopœic tendency of the mind.

Amnesia. The loss of memory is called *amnesia*, and occurs in various forms. The amnesia may concern merely a certain period of time from a few hours to several years, or it may involve certain events or senses and centers. The visual, the tactile, the muscular, and the auditory memories are lost, as indicated above, when the respective senses become anæsthetic or their brain-centers impaired. Sometimes amnesia comes and goes, causing an alternation between two or more systems of consciousness; or the amnesia may include the entire mental experience and be absolute and irretraceable. Illustrations of amnesia will be found in another chapter (pp. 252–254).

Cultivation of Memory. It follows from the above

analysis, that cultivation of the memory has meaning in but a very limited sense. "By taking thought" we can no more add to our mental "stature" than to our physical; but there is such a thing as education, a making the most of inherent powers, applicable also to memory. First of all, it is plain that it must be seen to that the brain be properly nourished and kept from fatigue, and that there be maintained a sound digestion and healthy, vigorous circulation. Facts that we desire to remember must be fixed in attention, so that the impression may be definite and vivid; they should be correlated with other facts, and repeatedly attended to, so that in the recall of the impressions, there may be as many avenues of approach as possible. How essential thorough assimilation of knowledge is to memory, appears from the advice given to his sons by Sir Thomas Fowell Buxton, recorded in his *Memoirs:* "What you do know, know thoroughly. There are few instances in modern times of a rise equal to that of Sir Edward Sugden. After one of the Weymouth elections I was shut up with him in a carriage for twenty-four hours. I ventured to ask him, what was the secret of his success; his answer was: 'I resolved, when beginning to read law, to make everything I acquired perfectly my own, and never to go to a second thing till I had entirely accomplished the first. Many of my competitors read as much in a day as I read in a week; but, at the end of twelve months, my knowledge was as fresh as on the day it was acquired, while their's had glided away from their recollection.' " [1]

Finally the recall must be made as distinct and ac-

[1] Quoted from Porter, *Elements of Intellectual Science,* New York, 1885.

curate as possible, so as to establish a correct habit. Inaccuracy in recall or statement, whether intentional or not, is fatal to accurate memory. It is said of General Grant that he was "tediously truthful." He would, e. g., take the trouble to walk some distance to say to an officer, with whom he had been talking, "I was mistaken when I told you that my conversation with Dr. ——— occurred inside his tent; that was not correct; it took place while we were standing in front of his tent." [1] No one who had ever served with Grant, could fail to be impressed with his excellent memory and the pains he invariably took to state occurrences with positive accuracy.

Mnemonics. Systems of mnemonics, of which there are many, have but a limited application, and to the extent that they are unnatural, which they all are more or less, they are harmful and burdensome to the memory.

[1] Gen. Horace Porter, *Campaigning With Grant.*

CHAPTER XIV

IMAGINATION

Reproductive and Constructive Imagination. It was said that many memories take the form of more or less definite images. To the extent that memory brings up these pictures, it is imagination. Inversely, all imagination implies a reproduction, so to speak, of original sensations and feelings. If the reproduction is of an impression of a particular thing, as when I definitely picture to myself the face of a friend, it may be called reproductive imagination; but if the images are freed from the particulars and have no reference to a special time and place, as when Homer pictured a sorceress, Circe, changing the companions of Ulysses to swine; or when he inhabited an island with a race of one-eyed giants, and another with beings half woman, half fish, whose song was first ecstasy, then death, the process employed may be designated free, or constructive imagination. In any case, imagination can picture no other qualities than such as were originally experienced in sensation or emotion. The poet, the novelist, the inventor, as well as the painter and sculptor, endow their creations in mind, with colors, sounds, outlines, relations, or mental properties, that were first experienced by the authors here and there in time and space.

Kinds of Images. The varieties of images correspond to the varieties of impressions. Visual imagination yields

pictures of form, color, light; auditory imagination, of sound; motor imagination, of motion, action, rhythm, as represented by sensations of the muscles and joints; tactual imagination, of pressure; gustatory imagination, of tastes; etc.

Prominence of some Kinds of Images. Undoubtedly every normal person employs images of every kind. However, not every type holds an equally important place as a thought-factor. The very name "imagination," speaks for the prominence of the visual. Some types of images are so obscure that we are hardly conscious of their existence.

Types of Imagination. There is a tendency, moreover, in each individual, to employ only one or two forms of images in thought to the relative exclusion of the rest. A person that thinks, or represents his objects of thought in images of sight, is a so-called visualist; one that largely employs representations of touch, as is the case when he is blind and deaf, is a tactualist; one largely employing motor images, a motile; images of sound, audile; of smell, olfactaire. It matters little in what form the original impression was made, the mind has a tendency to translate it into a type suited to its habit. Thus the visualist hearing a word sounded, will be apt immediately to picture it in visual terms, i. e., picture either the object or the written or printed word; and the person in whom motor imagination predominates (the motile) will be inclined to represent the sounded or written word in vocal-motor images.

Careful investigations, for statistical purposes, have been made by Fechner, Galton, James, and others, regarding the imagination of different persons. Of one

hundred cases reported by a recent investigator,[1] eighty-two were predominantly visualists, six audiles, four motiles, one tactualist, while five were equally visualists and audiles, and two equally visualists and motiles.

Visual Imagination. The thought and memories of strong visualizers abound in images full of color and detail. The letters of the alphabet, the numerals, days of the week, etc., are generally "schematized," i. e., they are located in space and are otherwise pictured in various ways. Galton says that he has many cases of persons reading off scores from the mental image, when playing the pianoforte, or the words from the imaged manuscript, when making speeches. He has found some few persons that see an image in print of every word that is uttered; "they attend to the visual equivalent and not to the sound of the words, and they read them off usually as from a long imaginary strip of paper, such as is unwound from telegraphic instruments." [2]

One of James' good visualizers says: "This morning's breakfast-table is both dim and bright; it is dim if I try to think of it when my eyes are open upon any object; it is perfectly clear and bright if I think of it with my eyes closed. . . . I have more power to recall color than any other one thing: if, for example, I were to recall a plate decorated with flowers, I could reproduce in a drawing the exact tone, etc. The color of anything that was on the table is perfectly vivid. . . . I can look down the mentally seen page and see the words that *commence* all

[1] R. H. Stetson, *Types of Imagination, Psychological Review*, III, p. 403.

[2] *Inquiries Into Human Faculty*, New York, 1883, p. 96.

the lines, and from any one of these words I can continue the line." [1]

Auditory Imagination. The class strong in auditory imagination is comparatively small. The audiles have images of sound, as, e. g., of words and music, where the visualist would have images of the printed page, etc. It was probably by means of sound images that Mozart was able to write down *Miserere* after having heard it but twice. Perhaps many representations of sounded words and music are not in sound but in motor images; i. e., we have an image of the sensation arising from the use of the vocal organ in producing the sounds, or even of the muscular and joint sensations occurring while playing the music on an instrument. From an account already alluded to, we see that "of 83 reporting as to how they recalled a memorized piece of music, 25 reported by auditory, 23 by tactile and motor, and 35 by visual images." [2]

Motor Imagination. Motor images are undoubtedly employed much more abundantly than was formerly supposed. The investigations of late [3] show school-children's decided interest in action and the use to which objects are put. This interest is probably proportionate to the motor images of the child. Beethoven, when quite deaf, composed the *Ninth Symphony*, employing as aids in its composition various musical instruments. Czermak, and later Stricker, have pointed out the fact that when imagining an object as quite near, and then abruptly picturing one far removed, we will feel a change in the

[1] *Principles of Psychology*, II, p. 56.

[2] R. H. Stetson, op. cit.

[3] By Professor Barnes, of Stanford University.

eyes, from convergence to parallelism of the visual axes. Stricker has also pointed out the difficulty in imagining such words as "bubble" and "toddle," while holding the mouth open. Out of one hundred cases reported to Mr. Stetson, sixty employed suppressed articulation in reading.

Tactual Imagination. In the normal person, tactual imagination is not very pronounced, and often it seems to be lacking entirely. Stetson's statistics enumerate but one case out of one hundred examined. "In this case, general concepts are not imaged in any way. Dreams are almost exclusively tactual. It would be hard to imagine a tactual scheme for numbers, yet this man's imagination solves the problem easily enough. His number-scheme consists of the representation of the series of sensations produced by tapping the tips of the fingers of the right hand successively upon the surface." [1]

Tactual and motor images are chiefly employed by the blind and blind deaf-mutes, such as Helen Keller and Laura Bridgman. A Yale man,[2] who is blind, states that a geometric proposition is represented to his mind "as raised on a piece of paper." Something infinitesimally small is pictured by him as a thin piece of paper divided and subdivided in his fingers to the minutest degree possible. Infinity he imagines as himself in the water with a life-preserver on, his face away from the shore and not hearing any one, and then swimming on and on without ever reaching a resting place, etc.[3] Persons, whose sight is restored to them, after having been blind, are not able

[1] Op. cit., p. 408.

[2] Alexander Cameron.

[3] *Psychological Review*, IV, p. 391.

to understand objects as seen, until they represent them in imagination in tactual terms.

Age, Disease, and Training Modifying Factors. The power to form mental images is higher in the female than in the male, and seems to vary at different periods of life; occupation and training may modify it, and disease destroy it altogether. Early in life the power reaches its maximum, then begins gradually to decline as the tendency to symbolize, or to use the concept for the concrete thing increases. Accordingly, Galton found to his astonishment that the great majority of the men of science, whom he first questioned, "protested that mental imagery was unknown to them;" they were as unconscious of its true nature as a color-blind man is of the nature of color. A patient of Charcot's, who had been a strong visualizer, through an injury to his brain, lost this power entirely, without perverting any other faculty. Every time that he returns to his home town, after having been away, he views the monuments, houses, and streets as if he had never seen them. He cannot image the principal public place of the town, nor his wife and children. "My wife has black hair, this I know," said he, "but I can no more recall its color than I can her person and features." [1] Several of Stetson's cases reported a difference in their imagination when differently occupied. Galton, after a little practice, was able to solve simple problems of addition and subtraction by images of smell and taste.[2]

[1] Quoted from James' *Psychology* (Briefer Course), New York, 1893, p. 309.

[2] *Arithmetic by Smell, Psychological Review*, I, p. 61.

CHAPTER XV

CONCEPTION

The Consciousness of Meaning. The mind is not a disinterested recipient of various impressions, but besides reacting on these, it attaches meaning or significance to them. Developed normal human consciousness is intelligent, as may be perceived in the very glance of the eye and the words and movements of a person; that is to say, every normal person understands his surroundings for practical purposes, and his acts are then adapted to them. When he is no longer able to perceive the meaning of his experiences, bewilderment follows.

Conception. The mental process that gives meaning to our experiences is *conception*. At first the sensations and perceptions that come to us are meaningless. Let us suppose that one of the earliest impressions is that of the mother's eye. At first it means absolutely nothing to the infant. It calls up no recollections, suggests nothing, and is related to nothing. In time, however, the eye is recognized and distinguished from other objects; it suggests various facts, and its similarity to other eyes is recognized—in short, the child has gained the idea of an eye. That impression, at first meaningless, has developed into a significant thing, and the process that has done this is that of conception.

Conception Defined. In general we may say of conception that it is a selective and eliminating power, which

has gradually evolved in the race, and primarily served man to adapt himself to his environment. It is conception that classifies our countless impressions under various concepts, or ideas, and by that very act extends our knowledge of the world. For example, when we have once formed the idea of fire, we need not thrust our fingers into every flame we afterwards come to in order to know that it burns, as that is implied in the very concept of fire. It is apparent that without the concept we would not know that the fire of today will burn our fingers, in spite of the fact that we had been burned many times before. Thus we see that conception is a teleological process that serves to simplify our experiences and give us knowledge of the world.

Discrimination in Conception. Conception involves several distinguishable stages. It involves discrimination of objects, qualities, or mental states. Everything is not the same. This thing is different from that, the horse from the dog, blue from red, etc. There are different individuals, qualities, and experiences.

Conception a Relating Activity. Conception involves also a perception of similarity and relationship in the midst of differences. While the horse is different from the dog, they are, nevertheless, in some respects alike. Both horse and dog eat, breathe, move, etc. They are *animals*, hence related both in fact and in thought. Conception is a relating activity. When we conceive *animal* of this, that, and other objects, we virtually class them, or relate them to each other.

Conception an Eliminating and Selective Process. Conception is an eliminating and selective process. While differences and similarity are perceived, the latter is

kept in the foreground of consciousness for use, and the differences are dismissed or suppressed because they can serve no end. When we conceive *animal* we retain in thought for our purposes just those qualities and characteristics in which lies the likeness in the horse and dog; and when we conceive the mouse as an animal also, it is by selecting these same qualities and characteristics that were seen in the horse and dog, viz., spontaneous movement, breathing, etc.

Conception a Creative Process. Conception has for its end the formation of an object of thought, usually called concept, general notion, or idea. Conception is the process, and its product is the concept. Conception, therefore, is a creative process. It produces a world of thought-objects, all related to the mind and to each other. Only to the extent that we have conceived, or created the world in our thoughts, to that extent is the world intelligible to us. Perception is of this and that thing, while conception regards this and that as trees, or men, or something else, hence imparts meaning to the perception; or as Kant puts it: "Perceptions without concepts are blind." [1] When we have a mere percept of an object it stands for nothing, is related to nothing, and means nothing. Yet as soon as the mind conceives an object as a lamp or a knife or something else, then it is *placed* in the world and our experience, and has meaning.

The Concept Universal—Conception and Imagination. Of the concept there is to be noted the following: The concept is universal, or general in its application. In this respect it is just the opposite from the percept, which is of individual, concrete things. When we see a man,

[1] *Kritik*, p. 75.

the percept is of a particular individual, yet when we conceive *man*, it is neither this nor that man in particular, but all and any beings that possess the qualities and characteristics that are implied in the term. To be sure, generally our concepts come to us as images,—auditory, visual, motor, or of some other sense. Man appears to us perhaps as a white man and not a Fiji Islander; or perhaps the idea presents itself as a motor image. When we conceive *horse*, it may be one of definite size and color. Whatever be the images employed in conception, they have the definiteness of ordinary mental images. Now the name or image that symbolizes the concept is particular, but the concept itself is *meaning* and therefore universal in application. When we say, this is an apple, we assert that our meaning of apple is exemplified in this concrete object, hence call it *apple* also.

Realism and Nominalism. The concept exists only for and in mind. This tree and that exist outside of the mind, as we perceive, but outside of the mind there is no thing corresponding to the general idea of tree. Plato and the Realists, as those idealists were called, ascribed real existence to concepts. There is somewhere in the universe (maintained the Realists from Plato down with great warmth), the general idea of tree, which is even more real than the trees that we perceive through the senses. This view was disputed with equal vigor by the Nominalists. These maintained that concepts are only names, and cannot exist independently and before the particular things.

Language Symbolized Conception. We said that the concept is a thought-object. Thought-objects like sense-

objects (things) are named. While the names of things are particular (the proper nouns of grammar), the names of concepts are class-names (common nouns and pronouns) and words expressing action (verbs), relation (prepositions), and quality and manner (adjectives and adverbs). In fact, were the conceptual words taken out of a language, what is left (the interjections and proper nouns) would not deserve the name of language. Language is virtually symbolized conception.

Language an Aid to Conception. It should not be forgotten, however, that language is an aid of incalculable value to conception. Language the symbol conserves, as it were, the concepts, not only for the individual but for a people. By means of language the conceptual life of one generation is transmitted to the next. We can thus understand how progress in thought in the case of an individual as well as of a whole people must be exceedingly slow unless there comes to assistance the beneficent influence of a highly developed language. It is no wonder, then, that races of earliest record, felt that language was a direct gift from the Lord of creation.

The expansion, application, and relations of concepts will be treated more or less in the next two chapters.

CHAPTER XVI

THINKING

Distinctive Characteristic of Man. The power to think consequentially and intricately is, no doubt, a heritage of man alone. That animals often adapt their acts to definite ends in novel circumstances, shows, undoubtedly, that they think in simple relations and have some conception, yet in so small a measure that practically to man alone belongs the attribute of *thinking, rational.* Though man is impelled and directed by natural instincts and impulses in his main activities, as has been seen, there is no phase of his life where thought, judgment, or reason, is not amply manifested. The history of civilization, or the progress of the race from most primitive conditions to the age of spiritual and material complexity, is largely the story of thought.

Thinking Defined. By *thinking,* in the broader sense, is meant a self-movement of consciousness, whether it be a revery, phantasy, an association of ideas though ever so loose, or a strict adherence to logical processes. But more accurately speaking, to deserve the name of thinking, the movement of consciousness must have an end in view and be directed by will according to judgment. Unless there is an aim at the attainment of some view or truth, whether it be the development of some subject in itself or the enrichment of the concept by establishing newly perceived relations, there can be

no directing by will; and, given an end, the movement toward it must be selective, critical, if the end is ever to be attained.

Two Kinds of Thought-Movement. Thought may be about things, qualities, and relations real or imaginary, which as objects of thought are particular, concrete, yet the thought itself is carried on by means of concepts. The thought-movement is in two general directions, viz., (1) movement for broader concepts, a generalization or unification of particular experiences under law, or general principle; and (2) movement for specialization, or the application of the general concept to the special, the particular. These two processes of thought are called respectively *inductive* and *deductive* reasoning.

History of Deduction and Induction. Historically, deduction is the first to receive formal recognition as a means of attaining truth. Aristotle, the founder of the science of logic, did not recognize induction to any considerable extent, and finally it was disregarded altogether. It was reserved for Francis Bacon to bring induction into prominence in logic, and we might say that now it predominates as a method for increasing our knowledge of the world and mind.

Induction. *Induction* is the very warp and woof of science. We cannot evolve the universe out of our consciousness, as was formerly supposed. To know what this world is in which we are placed, and to know ourselves we must observe facts. All knowledge progresses by experience. Perception of objects follows sensations, and conception having content follows sensation and perception. The essence of the inductive method is to observe particular, concrete facts, and from such

to derive general principles or laws, because as a matter of fact, the particular contains the general, or else the general could not be derived from any number of particular cases. For example, Newton observed bodies left without support falling to the ground. Newton inferred that if that is a characteristic or property of bodies here, then it includes the moon and all other celestial bodies. He began figuring and found that the curve which the moon describes can be accounted for by the falling of that satellite from the tangent of its orbit toward the earth. Hence was established the law of universal gravitation. And so it is with all scientific discoveries. Thus all science, in its first requirement, is a study about special, concrete facts, and in them it discovers the universal, which we denominate *principle* or *law*. It begins with *things* and ends in *thought* or *meaning*.

Induction as Conception. From this explanation it is apparent that induction is but a higher and intentional process of conception. As conception, so to speak, is broadened and enriched by experience of a simpler and more spontaneous kind, for the most part, so induction, with full purpose and systematic observation, including experimentation, enriches and deepens our previous and simpler concepts.

Deduction. *Deductive reasoning* consists in consciously establishing relations between judgments (specialized concepts) by means of a so-called middle term. If A is B, and B is C, we deduce the conclusion that A is C. While C included A even before it was perceived as a fact, the *conscious* relation of A to C had to be established through the medium of the common term, B.

Deduction Compared with Perception. In every process of deduction we note that a synthesis of judgments has been effected previously not existing (A is C), and further we are conscious of the ground (B) on which the process has been effected. In this respect deductive reasoning differs from simple perception and intuition. We have seen that in perception there is also an association or synthesis of certain immediately given elements with others not sensed. But this perceptive synthesis is spontaneous and immediate, and brings the thing perceived before consciousness as if it were sensed in all respects. To be sure, a perception may be described as a logical process. For example, "apple." All round bodies of a given size, color, etc., are apples. This body has all of these characteristics; therefore it is an apple. But we are positive that in consciousness there is no such lengthy process of ratiocination, but rather (symbolized in physiological terms) perception is a spontaneous neurone-discharge along the entire brain-tracts produced by the object.

Deduction a Specialization of Concepts. As induction is but a higher form of conception, so deduction is a process of mediation that makes *explicit* the implicit relations of concepts. Deductive reasoning applies the truth contained in the more general proposition, which was obtained by induction, to special instances.

Importance of Deduction. When we have the general fact, or principle, which obtains with a class of things, and is called the major proposition, we have much, yet it is also important to know its meaning applied to particular cases. Much obscurity, superstition, and inconsistency of belief and deed are due, not so

much to inadequate education and ignorance of principles, as to a failure or an inability properly to apply these to special cases. Said a young wife to me: "My husband has to work *so* hard. When he comes home in the evening after a hard day's work, he has to milk fourteen cows." I suggested that she might lighten his burden a little by helping him with the milking. "I wouldn't milk for any man!" "You don't love him," I ventured to say. "Love him!" she cried. "I worship the ground he walks on!" If some master-logician were to hold up to us the inconsistencies of our lives, of which we are constantly and unwittingly guilty, we would find ourselves great offenders indeed.

Relation of Induction and Deduction. Induction and deduction, although representing two different thought-movements, are nevertheless very closely related. Induction expands the concept, furnishes the general fact, while deduction applies the fact to particular cases, as stated before. But in arriving at a general fact, we are also enriching the particulars from which the general was derived; for by so doing, we perceive a universal element in the particulars; and in deducing a truth in respect to a particular thing, we are likewise making the general more significant. When by induction we reach the general proposition, All organic matter is oxidizable, we see the particular instances from which this truth was derived in a new light. Again, when we deduce that because in another instance a substance is oxidizable on the ground that it is organic, we are giving broader significance to the general law. It is in this sense that we can say that induction and deduction are two different phases of the same act. At any rate, in thinking, neither

one nor the other process is employed alone, but both are used, one supplementing the other.

Mysticism. Not all conclusions are reached by the ordinary methods. Mysticism, as a disposition of the mind, tends to introduce in thought principles not derived from induction and ratiocination or the ordinary channels of knowledge, but furnished principally by feeling and fancy.[1] Feeling superimposes itself or puts its definite impress, as it were, upon intellect, and thus the mystic, in his thought, starts from propositions that may seem eminently true to himself but may not be perceived by others except as mystical. Mysticism does not necessarily exclude valid reasoning; for, the philosophic teachings of some of the most distinguished thinkers in the world, such as Plato, Plotinus, Spinoza, Schelling, and Master Eckhart, have been mystical. Nor are the propositions of mysticism necessarily devoid of truth; for, no doubt, "there are more things in heaven and earth, than are dreamed of in our philosophy." In fact, the great propositions of religion and ethics may, in some respects, properly be regarded as postulates, not of induction, but of feeling, hence mystical.

Notwithstanding, mysticism has no place in science, except as a phenomenon that is to be explained, since the approved and only reliable methods of science are *induction* primarily and *deduction* next.[2]

[1] Cf. p. 127 ff.

[2] Ethics, the fundamental principle of which is the reality of obligation, is a science. Religious phenomena, however, have just begun to be treated scientifically. First attempts in this direction are E. D. Starbuck's *The Psychology of Religion*, New York, 1900, and William James' *The Varieties of Religious Experience*, New York, 1902.

Intuition. Occasionally we are confronted with a phenomenon designated *intuition*. In this the mind recognizes at a glance or a bound, as it were, things and relations, that usually require a train of reasoning. This immediate recognition is a "blind leap to a conclusion"; we feel certain that we are right in our conclusion but cannot assign the reason. Intuition of a marked kind is seen in a few rare persons. A number of such cases are on record, of which there may be mentioned here a mathematical prodigy named Zera Colburn, "a child under eight years of age, who without any previous knowledge of the common rules of arithmetic, or even of the use and power of the Arabic numerals and without having given any attention to the subject, possesses, as if by intuition, the singular faculty of solving a great variety of arithmetical questions by the mere operation of the mind, and without the usual assistance of any visible symbol or contrivance." For example, at a meeting of friends of his father the child raised 8· progressively to the 16th power, naming correctly the last result, which was 281,474,976,710,656.[1]

Intuition and Reasoning. Intuition is like reasoning in that it has a conclusion, which is known. Intuition, too, we may believe, is a mediating process that leads to the conclusion, just as there is a process of a kind in perception, but the process does not cross the threshold of consciousness.

[1] Quoted from Hudson's *Law of Psychic Phenomena,* Chicago, 1894.

CHAPTER XVII

KNOWLEDGE

The Problem of Knowledge. One of the most extensively discussed problems in the psychology of the past is that of knowledge. Though to practical thought nothing seems plainer, yet subjected to analysis it is indeed difficult to answer the question, What is knowledge? In this brief chapter we cannot hope to do more than to touch upon a few of the points involved.

At the outset we must distinguish the elements of knowledge and those mental processes that are concerned with the elements resulting in an established relation that is called knowledge.

Elements of Knowledge. The elements of knowledge are all those simple states of consciousness that admit of being related. Any mental experience that cannot be taken up in a relating process and thus become a matter of the understanding, cannot be called an element of knowledge. Usually psychologists deny to feelings and volitions that characteristic, hence do not include them among the elements of knowledge. Yet this view, it seems to us, denies the very principle of knowledge—the principle of relativity. To be sure, an individual's feelings are strictly his own, and can signify nothing particularly to any other individual; but it has much significance to the subject who experiences it as his own. A feeling may be as much an object of knowledge as the

thing (sensation-group) that is the occasion of the feeling, but with this difference: the feeling is alone for the individual to perceive, real yet evanescent, important yet often uncertain, while the thing—the sensation-group—is for every individual definite and constant under precisely the same environment. All hear the bell, and see it swing in the belfry. So especially sensations are the elements of knowledge, because the mind eminently involves them in those relating, constructive, and analytic processes, that have already been described as perception, fusion and discrimination, conception and reasoning. So important is sensation to knowledge that it is no wonder that a certain school of psychology, called the Sensationalists, derived the whole mind with all its contents from sensations.

Knowledge expresses Relation. But the elements of knowledge are not knowledge any more than a heap of stones and timber is a house. Knowledge must express a relation. The pulse of consciousness that we may imagine as throbbing through the mind of an infant as the first ray of light strikes its eyes, is as yet not knowledge, until the mind may say to itself: I recognize it; or: It is pleasant to me; it is bright; it is light. But such a proposition is much more than a mere sensation of light. This and not that is light, and not sound or taste. Besides sensation in this and perception, there are discrimination, conception, judgment,—all of which imply or express a relation. Moreover, in these activities memory is involved. In fact, no one single idea, or experience, can be knowledge until it is somehow perceived in relation to some other.

Knowledge and Conception. If, then, what was said in

the two preceding chapters is true,—viz., that when perceptions are freed from the particular, concrete, special elements, they result in a general idea, or concept, and that the two processes of reasoning, induction and deduction, are processes of expanding concepts, or determining their import,—then the end and goal of all intellectual processes, as such, is the concept. Whatever understanding or knowledge we have lies in the concept or is concerned in its modification. What, then, is true of the conditions and development of the concept, applies directly to knowledge.

Growth of Knowledge. It follows that there can be no leaps in acquiring knowledge. Knowledge cannot be poured into the mind as we can transfer matter from one place to another. A certain linguist said that a foreign language cannot be taught; it must be learned. It might be added, nothing else can be taught. The new and the unknown must be brought into vital relation with the mind and its content. In fact, to regard knowledge as something outside of and apart from mind, is erroneous. For if knowledge is anything at all, it is the mind functioning in a certain manner, and the acquisition of new knowledge is the expansion or development of the mind itself expressive of its experiences and reactions to what we call an external world—it is the growth of the concept. In these facts lie the gist and substance of the much and lengthily discussed problem of apperception—a term, by the way, which can be dispensed with in psychology. Either new material, so to speak, is taken up under an old concept, or else the old concept is modified by the new material; and if neither one nor the other applies, then the words of the great Teacher

must hold: They have eyes and see not, and ears and hear not.

When the Union Pacific Railway was built across the plains, the steam-locomotive did not arouse wonder and interest in the Indian,—it was altogether too far removed from his stock-concepts. There was nothing in the engine that he could associate with his other ideas, but when the telegraph lines began to be put up, and men climbed up the poles with iron climbers, whole bands of natives followed the line-men for hundreds of miles to see them climb. Here was something new, yet it contained a sufficiently old and familiar element, so as to be comprehensible and interesting. The Indian chief in Alaska, who had seen the white men carry their provisions in the form of canned goods, when shown a phonograph in operation for the first time, looked it over from every side, and concluded that it was "canned white man." The explanation sufficed for him. His concept "canned" permitted the expansion as to include the human voice, etc. Quite different was the explanation of the same object by a French savant. "I was present one day," says the distinguished French astronomer Flammarion, "at a meeting of the Academy of Sciences. It was a day to be remembered, for its proceedings were absurd. DuMoncel introduced Edison's phonograph to the learned assembly. When the presentation had been made, the proper person began quietly to recite the usual formula as he registered it upon his roll. Then a middle-aged academician, whose mind was stored—nay, saturated—with traditions drawn from his culture in the classics, rose, and, nobly indignant at the audacity of the inventor, rushed towards the man who represented Edi-

son, and seized him by the collar, crying: 'Wretch! We are not to be made dupes of by a ventriloquist!' This member of the Institute was Monsieur Bouillaud. The day was the 11th of March, 1878. The most curious thing about it was that six months later, on September 30th, before a similar assembly, the same man considered himself bound in honor to declare that after a close examination he could find nothing in the invention but ventriloquism, and 'that it was impossible to admit that mere vile metal could perform the work of human phonation.'" [1]

Knowledge Understood. Real knowledge, it is to be noted, is always understood. For example, we are told that the revolution of the moon about the earth is due to the two forces of momentum and gravity. We may be able to repeat this statement accurately, and assent to it, yet to understand it we must know what are momentum and gravity, and then be able to combine the two in thought in such a manner that the resultant of the two forces is necessarily seen as a circular motion. Accepting without understanding is not knowledge. It does not elicit response of the whole mind with its content. Failure to understand indicates a failure of the facts to fit any concept. This is one difference between knowledge and belief.

Reality in Knowledge and Belief. Belief is not knowledge, yet we *believe* in the validity of knowledge. The objective reality of that which we know or believe has no bearing upon the distinction between belief and knowledge. For what we know may be true or not, the same as what we believe. To be sure, inasmuch as be-

[1] *The Unknown*, New York and London, 1902, pp. 3 and 4.

lief comprehends vastly more than knowledge, i. e., we believe more than we know, it follows that knowledge is vastly more reliable than belief as presenting to the mind objective reality. Yet even knowledge is not necessarily valid, as judged by an ultimate criterion of reality and truth. For even the history of science discloses a series of error and misconception mixed with truth. For illustrations we need not go back far either, but take present-day facts. After years of absolute conviction concerning the universality of gravitation, scientists are meeting difficulties that raise the question whether or not gravity is but a phenomenon of a force behind the phenomenon. After the recent discovery of radium the older view of the chemical atom must be abandoned, and even more far-reaching reconstructions in scientific concepts are hinted at. But this does not change knowledge as a mental fact, as explained above; it simply points out the fact that the difference between belief and knowledge is not of kind but of degree, inasmuch as even knowledge implies and is belief, fortified with and incorporated into the stock-concepts of the mind.

Let us now very briefly consider certain ideas or forms of knowledge or belief, viz., the reality of things, time and space, and cause and effect.

The Idea of Reality. We believe the world and the things in it to be most real. Now reality as such is not perceived by the senses. We perceive only color, weight, light, sound, and smell, and it is a most pertinent question, whence the sense of reality, of substance, behind these phenomena? The answer is that the sense of reality and the belief in substance, which no man has

ever seen, spring from the nature of consciousness. The reality-sense inheres in the nature of some forms of consciousness, due, probably, to the vividness, certain quality, and persistency of the mental experience, and the absence of contradictions. Sensations eminently possess these characteristics and put us in knowledge of a most real world, which is the occasion of the sensations. However, hallucination does quite as much to arouse the sense of reality, even though the mind may perceive contradictions and understand the nature of the mental affection. In the hypnotic state and in dreaming, the sense of reality prevails concerning everything, even the most absurd, not because the forms of consciousness prevailing in these states possess that quality, vividness, and persistency, just spoken of, but because of the complete absence of the critical judgment. The dream-world stands most real and substantial until wakefulness restores critical power and shows contradictions. The sense of reality, then, we should say, is produced by a domination more or less complete (as further set forth in the chapter on Suggestion) of certain impressions or ideas in the mind. This reality-feeling may be either augmented or reduced by the use of certain drugs, or it is sometimes entirely destroyed by disease.

The Ideas of Time and Space. The ideas of time and space are likewise positive and definite. Time expresses sequence of events, and space, relation of objects; yet aside from events and objects we think of time and space as infinite, without beginning and without end. They are not caused and not causes, nor can we think them away. They are real, and yet they are not the same

kind of a reality as objects. We cannot even think of ourselves and objects without employing the ideas of time and space.

It is apparent that this knowledge of time and space is not derived as knowledge of things is derived, viz., by experience through the senses (*a posteriori*). Years of observation and study are needed before we know the world of things even superficially, yet as soon as we come to the consciousness of time and space at all, which, to be sure, comes about by definite experience of sensation and general mental activity, we have the knowledge of them in completeness, and no amount of experience adds or alters in the least our ideas of their attributes. That being the case, the knowledge of time and space must be intuitive, *a priori*, i. e., simultaneous with consciousness, especially with perception. In other words, the mind thinks, perceives, and conceives events, things, and self, temporally and spatially. The mind functioning gives form to its materials; it leaves its impress of time and space upon its ideas, just as the potter leaves his finger-marks upon the plastic clay in his hands. This means that time and space, as we know them, exist only in the mind, which is "the immortal discovery" of Kant. Undoubtedly this is hard to concede, and absurd to many. For, it may be said, we cannot even think of a timeless and spaceless universe! It is utterly unimaginable! Exactly. The mind cannot think and imagine without employing the ideas of time and space. That would be asking the mind to act other than itself; it would be requiring the impossible.

The Idea of Cause and Effect. The idea of causality is the conviction we have that every effect must have an

adequate cause. From nothing, nothing can come. A given cause will invariably produce a certain effect. Whatever exists has its antecedent conditions, be it the work of man or nature. This is true not only here but it must also be true anywhere else, though billions of world-cycles removed. The conservation and correlation of energy is the great creed of science. No energy can be destroyed or put out of existence, because energy is an efficient cause that must have an effect, which in turn is a cause for another effect, and so *ad infinitum*. Now whence this conviction?

Hume, subjecting the idea of causality to criticism, came to the conclusion that it is all derived from experience. We see one event immediately following another. The billiard ball striking another, imparts motion to the second, and this holds as far as observation goes, but in no case are we aware that an influence or energy passes from the first—the cause, to the second—the effect. So far as we know there is no necessary connection between cause and effect. Yet whence the idea of necessity, of compulsion? Hume answers that having observed that one event invariably follows another, a habit of anticipation is established in the mind, which is felt as *necessity*. This view, it seems, but partially explains the matter, when we consider the very small amount of experience in comparison with the infinite vastness and ineradicableness of the conviction concerning causality. After the idea of causality is once awakened, experience does not add to it either as to its universality or its necessity; it merely finds definite application and differentiations of the principle. Therefore the conclusion is thrust upon us that causality is a prin-

ciple of the mind—a mode of conceiving our own acts and the events of our world. As to the objective validity of cause and effect, which does not particularly concern us here, we can only say, that the conviction is unavoidable that the whole universe stands related in all its parts. In fact, philosophically speaking, it has no parts—it is a whole standing in universal relationship, in which a change here, though ever so small, means a universal change.

CHAPTER XVIII

SUGGESTION

Contraction and Expansion of Living Cell. We find that the simplest living cell, a minute mass of protoplasm, when in any way disturbed or stimulated by a foreign body, contracts. It also has a corresponding expansive power, which is operative in certain of its functions. As we ascend the scale, passing from the simpler life to the higher and more complex, we everywhere find the same contractile and expansive movements, or rather differentiated forms of these, which appear on the presence of the proper stimuli. The more complex the organism is, the more complicated the reactions are following a stimulation. All emotional waves, affecting more or less perceptibly the whole body, and all impulsive and instinctive movements and acts, are reactions from sense-stimuli or centrally originated ideas. The latent energy that is stored in the cell is set free, or discharged, by the stimulus; and the kind of emotional attitude, impulse, or instinct that appears, is determined by the center that is affected by the stimulus. The stimulus may cause the organism to startle, tremble, shriek, to be momentarily paralyzed, etc.; or, on the other hand, to assume a defensive or aggressive attitude. In general terms, all sensitive organisms, from the lowest to the highest, respond or react to certain stimuli.

Tendency of Sensory Stimuli to be Converted into

Outgoing Impulses—Thought and Movement. Furthermore, the tendency of the nerve-centers to convert incoming stimuli into outgoing impulses, in the case of higher organisms, continues even where the stimuli arouse consciousness, although the consciousness tends to modify the outgoing impulse. Even when consciousness is aroused, as is the case in thinking, there are continual changes taking place in the whole body. James has rightly said that all consciousness, if sufficiently intense, is impulsive. Experiment shows that not only are the voluntary muscles affected, but also the whole vascular system, the various secretory glands, the bladder, the pupils, respiration, and the alimentary organs. The blush or pallor that mounts one's cheeks is easily noticed, but when the disturbance is not so strong, the plathysmograph may note the variations of the pulse. The ordinary coarser muscular movements are plain, but the "muscle readers"—often claiming to be "mind readers"—endowed with hyperæsthesia, or over-sensitiveness, can detect and interpret, to a certain extent, the infinitesimal movements of the muscles that result from and accompany thoughts and feelings. We have seen in former chapters [1] how attention and imagination of certain types involve actual or suppressed motor modifications.

This tendency carried out a little farther is illustrated by overt acts, such as actually moving the lips when reading to oneself, or even audibly expressing one's passing thoughts; or by gesture and pantomimic representation, so profuse with some individuals and nationalities. Unconscious movements of the hand corresponding to

[1] Pp. 56, 208.

various ideas, such as of space-direction or of form or motion capable of imitation, may be graphically registered. Quite realistic is the story in the *Arabian Nights*, of the porcelain dealer, who, while waiting for customers, pictures out to himself how he is going to grow wealthy by degrees, and then marry a lady, with whom he is going to inhabit a palace, and how, if she will not obey him, he will kick her out of it—and here he kicks over into fragments his whole wealth—a basket full of porcelain ware.

Continually we are impelled to execute our ideas. The modern view that "the idea of a movement is already the beginning of that movement," [1] is borne out on every hand. No sooner thought than done, is the rule in trivial matters. Standing on a high place suggests leaping down; a solemn assembly suggests laughing or shouting; a window of an uninhabited house out of the way, becomes a temptation to the small boy to try his throwing ability. An acquaintance of the writer could not cross a bridge without fearing that he might yield to the impulse to throw into the river below whatever he might be carrying. It is the thought of the consequences or principle, coming as a counter-suggestion, that acts as a restraining or an inhibitory force. In abnormal conditions, ideas or concepts often come into the mind with imperative force, and lodge there until the impulse is carried out, or the abnormal condition removed. Thus are to be accounted for the insane homicidal impulses, certain forms of kleptomania (irresistible impulse to steal), and pyromania (the mania to set things on fire).

Imitation. Imitation is also to be explained by the

[1] Baldwin, *Mental Development*, New York, 1903, p. 167.

mind's tendency to convert immediately ideas derived from without into movements. This instinct is particularly strong in persons whose inhibitory power is undeveloped, as in children and imbeciles. The perceived act or condition suggests the realization of it in respect to self, and unless there is an inhibition, there will be immediate imitation.

Inhibition. No one completely or even very largely inhibits the impulses and instinctive acts suggested by ideas. It is only he that has self-control in an eminent degree who eliminates those acts that are judged irrational, immoral, and imprudent.

The Reality-Feeling. Again, every state of consciousness, aroused either by an outward or inward stimulus, appears to itself as an indubitable fact. It contains the reality-feeling, and so the content of consciousness is also regarded as most real, unless contradictions appear. During childhood we live in the most real of worlds. Every fairy tale brought to our attention, our thoughts and most extravagant fancies have an air of reality. Belief in them is dispelled only upon perceiving serious contradiction, which arises from the use of our various senses, and from comparison of our fancies with our experiences with the actual world. And as long as the reality-feeling continues in respect to any mental states, so long our acts are suggested and determined by them. When an adult person loses his critical power, he becomes entirely unfit for the world, and he must be placed in charge of a warden so that his needs may be looked after and he may be kept from harmful acts.

Suspension of Critical Power. In normal health, the critical attitude is suspended during natural, somnambu-

listic, and hypnotic "sleep." In these states, when any consciousness is present, the reality-feeling is again dominant. In dream-life all ideas, images, and relations are felt as substantial and real, and the dreamer enters into the spirit to the extent that the train of associations is vivid. In somnambulism (the sleep of the "sleep-walker") the subject often manifests unusual mental activity, remarkable acumen of the senses, and extraordinary skill in the execution of his ideas. Thus a somnambule may get up, dress himself, and perform various acts often of a delicate and complicated character. Poets will write verses, musicians compose, mechanics ply their trade, and all this often in the dark or with eyes closed.

How Hypnosis is Induced. Similar, in several respects, to the somnambulistic sleep, is the hypnotic state. This state is brought about by the "narrowing of consciousness" so that everything be excluded but the operator. A word or a pass by him, or fixing of the subject's eyes on a bright object, may induce the hypnotic state, in which the latter believes all things and becomes perfectly consistent with any suggestion that may be made. Whatever method be employed in hypnotization, it must mean that the surroundings and all that is said and done by the operator are to conduce to the focusing of the subject's consciousness to the narrowest field. All distracting elements should be put away. Monotony should prevail. All thoughts but one should be suppressed and the entire attention fixed upon some one thing, viz., that of going into the hypnotic sleep. All passes and commands by the operator should be with a view to narrowing consciousness down to the smallest range. Any per-

son who cannot fix his attention for some length of time cannot be hypnotized, because his mental processes cannot be restrained sufficiently.

Hypnosis Defined and Described. When, however, the narrowing process has sufficiently advanced, then the subject has entered the state of hypnosis. Suggest to a person at such a time that he is his own grandfather and he will forthwith assume that rôle. Ask him any question and he will answer as his grandfather might have answered. Tell him that he is a clown or a kangaroo, and immediately he will fall into the spirit of his part and act it out better than he possibly could in his normal state. The hypnotic trance or sleep, then, is first of all a state of intense and abnormal suggestibility, in which the mind disregards all but the operator's behests, because the will is banished almost completely, as is also the critical power of the mind.

The deeper hypnotic states with all their events are afterwards forgotten by the subject. However, memory of them may sometimes be called up by insisting that they shall be remembered. Suggestion, in hypnosis, can affect the voluntary muscles; it can produce positive and negative hallucinations, and over-sensitiveness or exaltation of the senses (hyperæsthesia). Physicians have used hypnotic suggestion instead of anæsthetics, as chloroform and ether, on patients, and amputated limbs, extracted teeth, performed dangerous operations, the patients experiencing no pain whatever. In certain subjects suggestion may cure rheumatism, produce a congestion, a burn or a blister, or bleeding of the nose. "It is quite certain," writes Braid, "that some patients can tell the shape of what is held an inch and a half from the

skin on the back of the neck, crown of the head, arm, or hand, or other parts of the body, the extremely exalted sensibility of the skin enabling them to discern the shape of the object so presented from its tendency to emit or absorb caloric. . . . A patient could feel and obey the motion of a glass funnel passed through the air at a distance of fifteen feet." [1]

Suggestion Defined. In the facts presented we have no difficulty in discovering an important principle—that of suggestion, which in its earlier and most fundamental aspect is simple *sensibility and reaction to nervous stimulation,* while in its developed and psychic aspect (suggestion proper) is the *tendency of more or less definitely developed ideal states or physical symbols of such ideal states to call forth certain motor attitudes and modifications.*

Physiological Suggestion. Among the varieties of suggestion, *physiological suggestion* is the earliest to appear, being most closely related to nervous reaction. Baldwin found that a child of his not a month old began to be receptive of suggestion, which was "conveyed by repeated stimulation under uniform conditions." The infant was put to sleep, face downward, by patting her gently upon the back. "This position soon became itself not only suggestive to the child of sleep, but sometimes necessary to sleep, even when she was laid across the nurse's lap in what seemed to be an uncomfortable position." [2] Under physiological suggestion may be classed all customary reactions upon conditions of position, etc., that occur unconsciously, such as maintaining equilibrium in walking.

[1] Quoted from Sidis, *Psychology of Suggestion,* New York, 1898, p. 149.

[2] *Mental Development,* New York, 1903, p. 110.

Sensori-Motor Suggestion. *Sensori-motor suggestion* appears next. For example, a sound, as the mother's lullaby, or a sensation of light, or its absence, may serve as a suggestion of sleep to the child. This kind of suggestion differs from the physiological as a process in the presence of clear consciousness in the form of sensations.

Ideo-Motor Suggestion. When the tendency to call forth an act is at the instance of a reproduced image, or a vivid idea, or "object with all its 'meaning,' " it may be called *ideo-motor suggestion.* This variety of suggestion is exemplified in imitation. According to Preyer, imitation begins at about the third or fourth month of life, but Baldwin's observations place it at nine months. A child of mine, of whom I kept a record, when eight months old showed her first clear case of imitation by trying to say tick-tock (which she pronounced "ti'-to' "), and when nine, by dipping a piece of bread into some fruit-jelly upon a plate, just as I had done myself while giving her some to taste.

Subconscious Suggestion. It is an interesting fact that suggestion may be occasioned by subconscious states or impressions. Says Baldwin on tune-suggestion: "I have tested in detail, for example, the conditions of the rise of so-called 'internal tunes'—we speak of 'tunes in our heads' or 'in our ears'—and find certain suggestive influences which in most cases cause these tunes to rise and take their course. Often, when a tune springs up 'in my head,' the same tune has been lately sung or whistled in my hearing, though quite unconsciously to myself. Often the tunes are those heard in church the previous day or earlier. Such a tune I am entirely unable to recall voluntarily: yet when it comes into my mind's ear, so to

speak, I readily recognize it as belonging to an earlier day's experience. Other cases show various accidental suggestions, such as the tune 'Mozart' suggested by the composer's name, the tune 'Gentle Annie' suggested by the name Annie, etc. In all these cases it is only after the tune has taken possession of consciousness, and after much seeking, that the suggesting influence is discovered.

"Closer analysis reveals the following facts. The 'time' of such internal tunes is usually dictated by some rhythmical subconscious occurrence. After hearty meals it is always the time of the heart-beat, unless there be 'in the air' some more impressive stimulus; as, for example, when on ship-board, the beat is with me invariably that of the engine-throbs. When walking it is the rhythm of the foot-fall." [1]

Universality and Importance of Suggestion. We then see that suggestibility is an important factor in normal life, ever more or less determining its outward behavior, and controlling it almost entirely in hypnosis. Its significance is as great as it is general and fundamental to life. Suggestion, in the broad sense of the word, is an important factor in the individual's and race's progress. It is suggestibility that converts the stimulus and idea into an expression or act; and to the extent that stimuli and ideas are new, it tends to break up or modify old habits and instincts by the introduction of new movements; and to the extent that stimuli and ideas remain the same, suggestion is the conservator of customs, language, manners, and institutions. Suggestion as the tendency to express reflexively states of consciousness in bodily changes, especially in vocables, furnishes the basis of

[1] Op. cit., pp. 135–136.

language; and as a tendency to mimic and imitate it enlarges and expedites the acquisition of the largest possible number of symbols for ideas. In short, through suggestion comes accommodation to physical, social, and spiritual environment.

Mental Epidemics. Socially and historically the significance of suggestibility may be seen in certain epidemic-like movements and affections that have, from time to time, stirred communities and even whole nations. The Crusades, which involved the great nations of Europe, started from the appeals of an insignificant hermit. The suggestion to possess the Holy Sepulcher found lodgment in a mental soil perfectly adapted, and soon the hosts of Christendom, including even children, launched out repeatedly on those ill-fated expeditions. The story of witchcraft and its suppression furnishes another instance of a persistent and wide-spread suggestion that held the nations in mortal fear, and sent thousands of guiltless wretches to the stake. The dancing mania has arisen at different times and places and spread over considerable areas. By thousands, men, women, and children were drawn into the dancing vortex. In Italy they danced to the tune of Tarantella, which was believed to cure the dancer from the supposedly poisonous bite of the tarantula, and so wide-spread became this mental epidemic that few were quite exempt from it. During the French Revolution the Carmagnole song drew the Parisian populace, men and women, into a wild dance that went whirling down the streets, and was conspicuous at the public executions. Quasi-religious epidemics, now very uncommon, furnish excellent illustrations of the varied possibilities of suggestion. The affected persons were

seized with quaking and trembling; or with ejaculations and rolling on the ground, accompanied with either deep remorse or intense joy; or with a swaying motion and a shouting of more or less meaningless phrases. In the great revival in Ohio, in 1800 (at one of the meetings at Cane Ridge, it is estimated that 20,000 people were present), some were taken with "the jerks," some with the "holy laugh," others with barking around a tree in veritable dog-fashion—they were "treeing the devil," etc.[1] During the Dark Ages (13th century) the Flagellants, seized by unexampled remorse, marched about in procession, almost entirely naked, scourging themselves with leather thongs that brought the blood. Lycanthropy, starting from the perverse instinct of some one, which served as the suggestion, became epidemic at times, and men, under the spell, prowled about as wolves to a most disgusting extent. One of the recent mental epidemics of this nature is that among the Doukobors, a Russian sect settled in the Canadian Northwest. First they discarded the use of animals in their farm-work, hitching themselves to the plow, etc. Then they left their homes *en masse* and wandered about naked or half-clad in quest of the Saviour. Neither reasoning nor entreaty could turn them back, as hunger, cold, and other hardships had not done. Nothing but force on the part of the Canadian authorities finally brought the fanatics back to their homes.

[1] V. McMaster's *History of the People of the United States*, vol. II, pp. 578–582.

CHAPTER XIX

THE SELF

Consciousness of Self. In all our consciousness there is ever present the feeling of self, or *I*. It is *I* that is thinking, feeling, or acting. It is *I* that is conscious. Whatever be the form or intensity of the consciousness, it is felt to be the self thus modified. This consciousness of self may exist in varying degrees, ranging between the state of almost complete unconsciousness of self to that of morbid self-consciousness. But even in the completest unconsciousness of self that we are capable of experiencing, the feeling of *I* is not absolutely wanting. This feeling of self in all our conscious states may be called indirect, or *essential* self-consciousness, as distinguished from the pronounced and more or less morbid self-consciousness.

Development of Consciousness of Self. The consciousness of self, though essential to consciousness *überhaupt*, is, nevertheless, subject to development. Probably the consciousness in infancy and early childhood is, so to speak, indefinite or general; but gradually it becomes definite and specific. There arises the broad distinction of the *self* and the *not self*. The self, at first, is felt to be the body with its conscious element. However, with time and development of the mental powers, the mental more and more gains prominence as an object of consciousness, until the person may feel as did Epictetus

the Stoic: "But nothing to me is the body, and nothing to me the parts of it." That is the final view regarding the self, viz., it is not physical but mental.

Interests of Self. To be sure, we can never be entirely freed from the idea that the body somehow shares in the self; but evidently this persistent idea springs from the relation existing between mind and body and the consequent interest in the body. Similarly the self has an interest in material possessions, in friends, church, club, country. Acts directed towards or by these are felt as personal, so that with what seems more than rhetorical right does James treat of the *material* and *social* selves, besides the *spiritual*. We suffer no indignities to be heaped upon our bodies. Our looks concern us much. We feel that somehow the clothes, the house, the possessions are a part of the man. We live as members of our circle of friends or organization, and often would rather risk life than stand by and suffer that social, religious, or political body of which we are members to endure shame and abuse. However, this cannot be taken as indicating real distinctions of the self, but rather the personal interests and lines of conduct. It is true, man's interests and activities go out for the attainment of material, social, and spiritual ends, yet the *self* of the man is that inner reality which says, *I control and do, I think, I feel.*

The Feeling of Identity. The self, conscious of itself in time, is felt as identical with the self of past moments. I am the identical I that was yesterday and years ago. Though I may have changed, improved or deteriorated, been moved by different purposes, and been possessed of other feelings, I am, notwithstanding, the same person

and not another. There is no uncertainty about this. The conviction is complete. The thread that runs in the fabric may here have this color and there another, now it may be woven so, and now some other way, but the thread is the identical one. Thus identity in self is each moment spontaneously perceived running back into the past along memory's thread. This is the normal experience. The self is the central, dominating, thinking factor, and it is identical with self as far back as memory reaches.

Theories of Self. These are the data respecting the self as found in consciousness by introspection. How are they explained? Scholasticism said the self is the soul, which is a simple unity, an indestructible, immaterial substance. To what extent this view disagrees with facts is yet to be seen. Another view is that of the Associationists, who reject the hypothesis of a simple soul-substance and substitute therefor the theory that self is "nothing but a bundle or collection of different perceptions, which succeed each other with an inconceivable rapidity, and are in a perpetual flux and movement," as Hume put the matter.[1] In other words, mind is nothing but many perceptions following each other so closely that somehow by virtue of the "inconceivable rapidity" and their instability they form an organic unity. The objection to this theory is given by Hume himself in an appendix to his *Treatise*. "But all my hopes vanish, when I come to explain the principles that unite our successive perceptions in our thought or consciousness. I cannot discover any theory, which gives me satisfaction on this head." Successive perceptions,

[1] *A Treatise of Human Nature*, Pt. IV, § VI.

no matter how rapidly they succeed each other, would still be successive and not a unity, such as is the self. No matter how many separate hemp fibers may be thrown on the floor, and how inconceivably rapidly they may follow each other, they would not form a hemp rope or a garment, unless there were something to unite and shape them into a rope or garment. Ribot, a French writer of much force, whose fundamental postulate is that all consciousness is but an attending phenomenon of physical states and processes, holds that the *ego* and its unity—which is only relative unity—is coördination of the physical organism, including the brain, and the *cohesion* of the attending states of consciousness. James has endeavored to overcome the objections to the assumption of cohesion in consciousness by making each moment or segment of the stream of consciousness contain, as it were, by inheritance all that has gone before, and self-perpetuating.

Extensive Observation and Comparison Necessary. It is evident to the modern student of psychology that the problem of self cannot be settled by logic or the facts of introspection alone, but that if an answer is ever to come, it will be the result of extensive observations and comparisons of data that concern the body of mental science. In the meantime, psychology must content itself with pointing out the conditions and the various effects upon the self.

The Self Changes. The consciousness of self is not always the same, but varies considerably, both as to kind and degree, though even this statement does not apply to different individuals to the same extent. Moodiness and changeableness are attributes applying to most

persons. Of few can we say that they are always "the same," and that only comparatively. It is true of all that at times we feel worthier, stronger mentally and physically, wiser, wittier, excelling more than at other times, when we feel lacking, incapable, discouraged, unworthy. There are daily fluctuations occurring in the normal organism marked by variations of bodily and mental functioning. In the forenoon, when the nerve-cells are most highly charged with energy, all functions of body and mind are performed most spontaneously, and there is a feeling of strength and ease, buoyancy and self-sufficiency that subsides later in the day more and more, until the early hours of the next morning are reached, when all activities are at a minimum. It is between three and four o'clock in the morning that the greatest daily depression is experienced, if awake at that time.

Cœnesthesis and Memory. The consciousness of self at any moment is the resultant of all one's sensations of physical condition and energy, called *cœnesthesis*, and all the memories, both explicit and implicit, of one's past life, achievements and experiences, social standing, mental power, and possessions. This consciousness of self may or may not give us the right estimate of ourselves. In youth the estimate of self is generally higher than actual accomplishments warrant, and in old age or sickness it is too low. Conceit as well as excessive humility show lack of balance. Still more marked is this in the melancholic patient, who is afflicted with a more or less persistent depression of spirits, especially in the early hours of the morning. In his depression he feels unworthy, dissatisfied, and diffident of his powers; or

if the depression is greater, the sense of misery is unspeakably intense.

Mercier has given us a graphic picture of the melancholic. "In such [severe] cases, the patient has a most miserable expression of face, his head droops on his breast, his arms hang listless by his sides, his forehead is puckered into innumerable wrinkles, his eyes are sunk, he weeps either constantly or frequently, his mouth is a picture of woe, and his whole attitude and expression are suggestive of misery and despair. Question him, and he does not answer; urge your question, and he groans and wrings his hands; still urge him, and he cries, and says in a feeble monotone that he is the most miserable and most wicked of men—that he is accursed of God and man—that he has committed the unpardonable sin, the sin against the Holy Ghost—that his wickedness is unspeakable—that he is unfit to live." [1]

The opposite, in unusual or abnormal exhilaration through the use of stimulants or narcotics, or other causes, such as mania, results, for the time being, in self-aggrandizement, the feeling of physical and mental power, varying in degree all the way from excellent spirits or conceit to megalomania. In mania and general paralysis there is an increase of all the bodily processes—secretion, digestion, assimilation, and nutrition —due to an exaltation of the nervous system. The body is well nourished and the muscles firm and vigorous, in spite of the fact that because of some defect in the brain, he may have lost so much of his power of motor control as not to be able to stand unsupported nor to direct his hand without blundering. Notwithstanding

[1] *Sanity and Insanity*, p. 338.

that the general paralytic may be in unattractive surroundings, and may be incapable of sitting up and feeding himself, he feels great and boasts of his exalted position in the universe, and of his great size, and bodily power, and wealth, health, and accomplishments. One poor fellow, I recall, who had been a cobbler, claimed to be "Prussian King of France"; another stammered that he had made the world—out of air. In any case, whether it be depression or exaltation, the feelings are not commensurate with the facts.

Changed Feeling of Self. Yet more radical changes may occur to affect the very sense of personal identity. In milder forms the person feels strange to himself, or feels that certain parts, such as the teeth, stomach, or brain, are gone; or that he is made of stone, glass, or butter. A woman described by Esquirol believed that the devil had carried off her body. A soldier, as related by Foville, thought that he had been dead since the battle of Austerlitz. "He is dead," said he of himself, "he was carried off by a cannon-ball. What you see here is not he, but a poor machine that they have made in imitation of him." [1] Sometimes a person feels himself double. For example, a convalescent mentioned by Leuret, believed that he was two individuals, one of whom was in bed, while the other walked about. In spite of the fact that he had no appetite, he ate much, as he thought he had two bodies to feed.[2] Mrs. H———, a lady, whose case came under my observation, among other things, gave me this written account of her peculiar experiences: "I went to M——— in April [1898]—I do not remember the exact date. I

[1] Quoted from Ribot, *Diseases of Personality*.

[2] Ribot, op. cit.

immediately became hypnotized by some unknown, unseen power. I could perceive the moral condition of the town, the church, the schools, and the individuals, and it was so bad that I felt it as a burden and wanted to exert myself to do something to better the conditions. I felt in a great measure that I was responsible for much of the bad condition. . . . I was sweeping the floor when I felt impressed to write a message purporting to be dictated by Martha H——— [Mr. H———'s first wife]. It was an appeal for physical help to aid me in my housework. It seemed to me as if the controlling power or influence wanted my strength for their work, and did not want me to do the house-work. I felt *compelled* to carry the letter I had written to my sister-in-law. . . . I delivered it without going into the house, and immediately returned to my own home, knelt down beside my bed and prayed. It seemed to be a supreme moment of my life, and I felt very anxious not to forget any one for whom I ought to pray. I shook and trembled with an exceeding great joy. Then this message came to me: 'Ring, ring the bells of Heaven! Elsie S———'s [Mrs. H———'s maiden name] soul is redeemed!' Then suddenly a rustling—a presence knelt beside me and this message to my mind: 'I give you a new name, Frances Willard.' Then all was calm and peaceful." Believing that Frances Willard was reincarnated in her, Mrs. H——— writes: "I insisted on having Mr. H——— and myself married again, the minister using the name of Frances. I was successful in getting the ceremony performed to my satisfaction, but I expect [suspect] I was a great trial to the Rev. Mr. V———. I cannot give my full experience—it is too bulky. I had a feeling that I had resigned my

body, giving it away, and that for the time being it was Frances Willard. The one body alternately belonged to Miss Willard, Martha H———, and myself, and my language and talk was according to which of the three I was representing. I was well and natural in each case, and when I was Elsie H———, was the same as I am now. Among many other things, Love, Matrimony, Virtue and Vice, were the subjects of lengthy discourses. . . . I believe my experience, during my so-called sickness (?) was given me to preserve my sanity, and Frances Willard was the instrument God used, at the same time it was an opportunity for Miss Willard to manifest Reincarnation, and she strengthened my moral courage to reveal her presence." Several months after receiving the manuscript from which the above is taken, I learned from the newspapers that Mrs. H——— had gone to the W. C. T. U. headquarters in Chicago, insisting that she was Frances Willard.

Alternating Personality. Still another condition affecting the self is one that is known as alternating personality, or double consciousness. The facts are somewhat like this: A person grows up and is conscious of himself as a distinct personality, and is also known by others to have such and such traits and characteristics. Through sickness or unheralded inner catastrophe, or external accident, the past is blotted out completely and the person begins practically a new life. He does not know himself as he was and much less his friends and relatives. He looks upon all things and persons as strange. As almost an infant he begins to learn speech over and familiarize himself with his surroundings. His progress is faster than it was the first time, but his development in regard

to character is distinct. The body, the brain, is the same, but the person, the character is apparently another. Mentally and morally he is another person in his second state. Then there may again occur a change, and the person resume mental life just where he had left it, when the first change came, and he be oblivious of all those months and years of his second state. Thus there may be an alternating from the first to a second state, and from the second to the first, without there being any memory of the one state when being in the other.

Example of Alternating Personality. The case of a young woman, as an example of this alternating from one state to another, lasting for four years, will suffice. "Her memory was capacious and well stored with a copious stock of ideas. Unexpectedly, and without any forewarning, she fell into a profound sleep, which continued several hours beyond the ordinary term. On waking, she was discovered to have lost every trace of acquired knowledge. Her memory was *tabula rasa*—all vestiges, both of words and things, were obliterated and gone. It was found necessary for her to learn everything again. She even acquired, by new efforts, the art of spelling, reading, writing, and calculating, and gradually became acquainted with the persons and objects around, like a being for the first time brought into the world. In these exercises she made considerable proficiency. But, after a few months, another fit of somnolency invaded her. On rousing from it, she found herself restored to the state she was in before the first paroxysm, but was wholly ignorant of every event and occurrence that had befallen her afterward. The former condition of her existence she now calls the old state, and the latter the new

state; and she is as unconscious of her double character as two distinct persons are of their respective natures. For example, in her old state she possesses all the original knowledge, in her new state only what she acquired since. . . . In the old state she possesses fine powers of penmanship, while in the new she writes a poor, awkward hand, having not had time or means to become an expert." [1]

Causes of Change of Self. The changes of self or of the feeling of self, are directly traceable to extensive bodily changes in a person, especially in the somæsthetic area,[2] or the anterior association center in the frontal lobes of the brain. Disturbances of self-consciousness are often the result of tactile anæsthesia. But just what takes place in alternating personality is hard to understand, unless we think of it as a break in memory, or a shifting from one associated memory-group to another, without there being any link between the two.

Alternating Personality an Exaggerated Form of Normal Consciousness. It is maintained, however, that there is nothing so unusual in these phenomena of multiple and alternating personality; for even in the most normal conditions do we find indications of this. As Professor Ladd says, "every case of 'double' or 'triple' consciousness is only a relative exaggeration of processes that customarily underlie the recognized forms of every so-called single consciousness." [3] Exactly. Several facts indicate this. The one is that in every one there are extensive uncon-

[1] Macnish, *Philosophy of Sleep*, quoted from Ribot, *Diseases of Memory*.

[2] V. p. 44.

[3] *Philosophy of Mind*, New York, 1895, p. 168.

scious quasi-mental processes going on, as shown in a former chapter, called by Ladd, the *psychic automaton*. This automaton vaguely accompanies the conscious self. But under circumstances the automaton, instead of running parallel with the self-conscious ego, assumes more or less exclusive control, and the work done, at times, far exceeds that of the conscious self. The work then is felt to be done by another, by a god, by inspiration, etc., as pointed out on p. 60. Or if the deeds of the automaton are regarded as unworthy of the real self, then the author may be thought to be a devil, or even a legion of devils.

The second fact to indicate that multiple consciousness is but an exaggerated form of normal processes, is what Ladd aptly styles the *dramatic sundering of the ego*. That is, we are able to put ourselves in the place of another, and think and act and feel as he does to a certain extent. The imagination builds a person not self. That is what the child does in playing that it is some one else. That is the mental attitude of the player of a rôle on the stage, and it is the spontaneous process of the dreamer in sleep. The characters that come in dream and talk to us, and, at times, outdo us in logic and brilliancy of speech, are felt to be others than self, and yet they are the creations of self.

The third consideration favoring the view that multiple consciousness is not foreign to normal automatism, is the fact that with a little practice nearly all, if not all, the phenomena observable in multiple consciousness can be made to appear in normal persons. This was accomplished in the experiments conducted in the Harvard laboratory.[1]

[1] Leon M. Solomons and Gertrude Stein, *Normal Motor Automatism, Psychological Review*, III, p. 492 ff.

These facts are of supreme importance in a practical way, but it is for applied psychology to consider fully how reformation and betterment of life may be brought about by reaching the subconscious and assuming the rôle of a noble character.

CHAPTER XX

MENTAL TYPES AND CHARACTERS

Varieties of Mind, and Change—Tendency toward a Type. As a comparatively few little bits of differently colored glass in the kaleidoscope are capable of producing an infinite variety of beautiful effects, so a few mental elements in man combined, as it were, in different proportions and amounts, make it possible to look upon an endless number of mental variations. What we are we are, and yet sex, age, health, climate, and social—including moral and intellectual—environment are continually modifying factors of the initial endowments and tendencies of mind. What we were ten years ago we are not today, and what we are today we shall not be ten years hence. The individual is continually subject to change, yet *individuals*, or society as a whole, tends constantly toward a type. The factors of civilization are working toward a standard, or an ideal. This means conformity to the customs, manners, thought, and morals of society, and consequently a rubbing off of our corners of idiosyncrasy and individual peculiarities, a strengthening of self-control, and development of taste. We do not care to be odd and "foreigners" in the eyes of the men among whom we live. Whether we in Rome should do as the Romans do, may be a question, but it is only a question of time when we shall be Romans, whether rightly so or not; and yet in spite of the tend-

encies toward one character, all cannot or will not attain to it. There is heterogeneity in society, and always will be under the operations of the laws of nature.

Classification of Minds. A classification of the various kinds of mind is a difficult matter, if it is to satisfy science; and still more so if it is, in addition, to serve the practical ends of description and identification in the ordinary walks of life. In fact the task is impossible. The more marked differences in mental character are due to several facts, which we may comprehend under (1) Nervous Reaction, (2) Development, and (3) Health and Equilibrium.

1. Nervous Reactions: Temperament. It is usual with modern psychologists to classify *temperaments* on the basis of the nervous system, its reaction or susceptibility to external and internal stimuli, and its tendencies to combine the reactions in various ways.[1] Wundt, by conceiving reactions as strong or weak, and quick or slow, obtains the following classification:

	Strong	Weak
Quick	*Choleric*	*Sanguine*
Slow	*Melancholic*	*Phlegmatic*

The person of a choleric temperament is quick to be impressed and is aroused to feel deeply. He is quick of wit, alert, impulsive, and emotional, hence likely to lack in inhibitory power. The will becomes thoroughly aroused and holds to its purpose until other impressions turn it in other directions. The melancholic person also has strong impressions, intense emotions, but they come slowly. He is tardy of action, meditative, and senti-

[1] Cf. Ladd, *Psychology, Descriptive and Explanatory*, New York, 1894, p. 650.

mental. Probably the poets belong to this class. Sanguine is the temperament of youth. The sanguine person is quickly aroused to action and emotion, but the impressions are shallow and soon give way to other experiences. The phlegmatic temperament is unemotional and sluggish in thought and action. In regard to will, the phlegmatic person resolves but slowly, but when once resolved he tenaciously clings to his purpose. He is thorough and conservative.

This classification of temperaments, it is to be understood, is somewhat ideal; for a person may not be described under any one of these four divisions. For example, it is said that among the English people the predominating type is a mixture of the phlegmatic and choleric. The four types of the scheme are the extremes, and each one may shade into any other. All that may be said, then, of a temperament which is not decidedly one or the other, is that it approximates this or that, or is halfway between two, or even has no particular temperament.

2. Development—Idiots and Cretins. As nervous development is not the same in all individuals, there are various mental types, especially as regards capacity. While the majority have a normal brain-development, there is a class, comprising a small per cent of the race—the idiots [1] and cretins—whose encephalic development is considerably retarded or abnormal. Small-headed, weak-minded, sometimes manifesting remarkable acumen in certain special directions, the idiot always presents a pitiable caricature of man. The cretins, found

[1] It is estimated that in England and Wales there is one idiot to every 400 people.

in all parts of the world, but particularly in the deep and dark valleys of mountains of Europe, are more brutish than human. They are small of stature, with irregularly shaped heads either very small or unusually large and showing other repulsive physical peculiarities, produced by a faulty, defective development and formation of brain and cranium, as shown by the report of the Sardinian commission and the researches of Professor Virchow. They are characterized by a mental and physical torpor and even complete mental imbecility.

Criminal Type. The criminal presents another case of arrested development. He is not a simple, accidental offender, but one who does not recognize any duties on his part, nor the rights of others; in fact, he seems to be utterly lacking the moral sense. His general sensibility is low—in particular he is insensible to pain—and therefore pitiless and cruel. He is lazy, remorseless, extremely vain, and fond of stimulants, gambling, and debauch. He is indifferent to religion, and dislikes altruism. He is cunning, although of inferior intelligence. His physiognomic characteristics are as pronounced as his mental.

Geniuses—Originality. On the other hand, there is a class of persons whose brain development is considerably above the average. The world's geniuses generally belong to this class—the men who have been able to conceive and do in a purely original manner.

The average man follows well beaten paths, both in thought and deed; the man of talent, through training excels in those common activities; while the genius, by a more highly developed nerve-organism, with which

nature has endowed him, is enabled to enter upon hitherto untried and undiscovered ways, where he accomplishes his work wholly in his own manner. "Hardly any of us," says Professor James, "can make new heads easily when fresh experiences come. Most of us grow more and more enslaved to the stock conceptions with which we have once become familiar, and less and less capable of assimilating impressions in any but the old ways. Old-fogyism, in short, is the inevitable terminus to which life sweeps us on. . . . Genius, in truth, means little more than the faculty of perceiving in an unhabitual way." [1] Thus also Nordau writes: "A bee that would build an octagonal or square honey-cell, instead of a hexagonal; a swallow that would find a new form for its nest; an ox that would rather allow himself to be killed than be yoked, would be a genius. But such the world has not yet experienced, while indeed it has seen men that have been able to accomplish equal deviations from inherited activities." [2]

Cranial Capacity. Of the several ways in which geniuses generally distinguish themselves, exceptionally large cranial capacity is one. Although there have been men of rare ability, such as Liebig, Guido Reni, Dante, and Shelley, the brain of each one of whom was smaller than the average, yet in most geniuses it is above the average. The brain of a normally developed male weighs from 1304 to 1502 grams, of a female from 1162 to 1332 grams, while in men of genius it weighs as high as 1842.7 grams.

Precocity. Many men of genius have distinguished themselves for their precocity. Thus Mozart's musical

[1] Op. cit., II, p. 110. [2] *Paradoxe.*

talent was revealed at three years of age, while at six he composed pieces with expertness. Dante, at nine, wrote a sonnet to Beatrice. Goethe wrote German, French, Italian, Latin, and Greek before he was eight. Byron wrote verses at twelve, and when eighteen years old, published his *Hours of Idleness*. Raphael found himself famous at fourteen. Bacon conceived his *Novum Organum* at fifteen. Hallam was the author of a sonnet before he was ten. Lessing, Grotius, Niebuhr, and Fénelon were prodigies in boyhood. To be sure, there are notable exceptions to precocity in men of high ability. Rousseau ran away from school at sixteen years of age, where he was looked upon as a dunce. Boileau was thought to be a confirmed dunce up to his thirtieth year. Goldsmith was and remained dull until his early manhood years. He produced nothing of worth in a literary way until after his thirty-second year.

Symptoms of Degeneracy. High brain development, precocity, originality, and capacity are not the only characteristics of geniuses. There is much in them at times resembling the characteristics and symptoms of the insane, and some writers, such as Nisbet [1] and Lombroso [2] would class them with the abnormal. It appears that the fundamental cause in both genius and many forms of insanity is the excessive psychical or nervous energy. The list of the world's geniuses reveals very many instances of hallucination, epilepsy, extreme vanity, lack of common sense, melancholy, and even insanity. Peter the Great was afflicted with convulsive movements, which distorted his face. Socrates often

[1] *The Insanity of Genius*, London, 1891.
[2] *The Man of Genius*, London, 1891.

danced and jumped in the street without any reason. Mozart, Schiller, and Alfieri had convulsions. Paganini was subject to catalepsy. Pascal had fits lasting for whole days. Handel had attacks of furious and epileptic rage. Goethe's mood, according to his own confession, passed from extreme joy to extreme melancholy The older brother of Richelieu committed suicide because of a rebuke from his parents, and his sister was insane. Richelieu himself, in an insane fit, believed he was a horse, and neighed and jumped, but afterwards had no recollections of it. Cavour twice attempted suicide. Charles Lamb, Robert Schumann, Cowper, and Swift became insane. Lombroso says that "the most complete type of madness in genius is presented to us by Schopenhauer," who was always misanthropic, pessimistic, and wretched. And so on.[1]

3. Mental Health and Equipoise. Health and equilibrium of mental activity constitute sanity. If the excitations are not caused by a diseased condition of the nerve-substance, nor are disproportionate to the stimulant; if the sensations and ideas are properly coördinated and inhibited; and if the emotions are normal accompaniments of perceptions, then the mind is acting sanely.

Sanity. As no mind, under given conditions, always functions and reacts absolutely the same, it is evident that there is no such thing as an absolutely sane mind. Therefore, theoretically speaking, every person is, at times and under circumstances, insane; but in the common acceptation of the word, the test of sanity must be a practical one. That person is sane who estimates his nature, powers, and surroundings sufficiently correctly

[1] Op. cit., p. 91.

for taking and maintaining his place in the world as a physical and social being.

Insanity. In the insane person there are various disturbances that unfit him for the practical duties and functions of life. He has various illusions, delusions, and hallucinations that he cannot rid himself of, and that finally he cannot distinguish from reality. Therefore he perforce acts in a world that is both real and unreal. Besides, there are often morbid propensities and imperative conceptions that the patient cannot resist, which lead him to perform the strangest and often most revolting acts. The emotional disturbances are various and more or less intense. Sadness, joy, rage, love, hatred, etc., capriciously afflict the patient. The power to remember suffers more or less loss, and sometimes the thread of consciousness is severed entirely. Loss of inhibition, too, usually occurs in insanity, which leaves the patient the plaything of his morbid emotions, ideas, and impulses; or the will may be so obstructed as to render the patient incapable of voluntary acts.

Insanity and Reason. The common notion that insanity invariably means a loss of reason is not correct, as often the acutest reasoning is found in the insane. When, however, the malady is severe or the affection general, the disturbance of mental powers includes also the reason. Zacchias relates that a visitor was shown about an insane hospital by a very intelligent cicerone, who so impressed the visitor by the explanations he gave of the patients, and by his skill in drawing out their delusions, etc., that the visitor supposed him to be one of the authorities of the institution, until they came to a certain cell. "Here is a sad case," said the cicerone, pointing out a patient,

"the worst one in the asylum. This poor fellow thinks he is the Redeemer of mankind—the fool, when it is I who am the true Redeemer." [1]

Forms of Insanity. Some of the commonest forms of insanity, according to the most recent classification,[2] are manic-depressive insanity, paranoia, paresis, dementia precox, involution melancholia, and senile psychoses. Manic-depressive insanity is a disease caused principally by hereditary taint, and is characterized by successive periods of exaltation, or mania, and depression, or melancholia. During the manic stage of the disease, there is a general loosening of the checks both of the physical and mental life. There are flights of ideas and motor and emotional excitement. The patient, in this stage, appears impatient, hopeful, witty, and cheerful. His self-esteem is increased. The melancholic period is characterized by a difficulty of thinking and a depression of movement and emotion. The patient feels unhappy and unworthy. Paranoia, sometimes called monomania, manifests itself only in particular directions. The monomaniac is "insane on one subject," while on every other point he may appear perfectly rational. Yet paranoia is quite persistent, in fact is a chronic form of insanity, either acquired or traceable to an inherited neuro-degenerative taint. General paresis, commonly designated softening of the brain, is an organic disease of the brain, resulting in a general breaking down of the brain-structure. Involution melancholia is a disease coming at about the age of forty or fifty years, and is characterized by great depression and apprehension. There is a sense

[1] Spitzka, *Manual of Insanity*, New York, 1895.

[2] Cf. Wm. A. White's *Outlines of Psychiatry*, New York, 1907.

of impending danger or of sinfulness. Senile psychoses occur in old age, marked by decline of mental and physical powers, often to a pathological extent. Dementia precox, or insanity of pubescence, occurs during or immediately following the period of puberty, i. e., between the twelfth and twenty-fifth years, and is characterized at first by a slight depression not as intense as that in melancholia, and then by mental enfeeblement accompanied by a disposition to be silly.

During adolescence the individual undergoes important physical changes, which, in some ways, profoundly affect his mental life. To quote from President G. Stanley Hall's brilliant and exhaustive work on adolescence: "Youth seeks to be, know, get, feel all that is highest, greatest, and best in man's estate, circumnutating in widening sweeps before it finds the right object upon which to climb. There are interpreted anticipations of greater joy which only true marriage and parenthood of body and soul can satisfy, foregleams of heroic achievement and secret 'excelsior' ambitions. It is the glorious dawn of imagination, which supplements individual limitations and expands the soul toward the dimensions of the race." [1] The boy's light-heartedness and carelessness with his lack of judgment and self-appreciation combine with the man's aspirations and feelings that arise at this period of transition, and the result, in most young men, is what Spitzka calls a "silly ambition, a mawkish sentimentality, and an obtrusive self-assertion." [2] In rare cases this state is not corrected by the social and educational influences.

[1] *Adolescence*, New York, 1905, II, p. 302.
[2] Op. cit.

INDEX

Aboulia, 89.
Acquisitiveness, 110.
Act, Analysis of, 78; the expression of actor's nature, 79.
Adolescence, 266.
Ænesidemus, 170.
Alternating Consciousness, 202, 252.
Amnesia, 202.
Anaxagoras, 151.
Angell, J. R., 75.
Anomalies, 17, 104.
Anticipation, 162.
Aphasia, 45.
Aphemia, 45.
Areas, Cortical, 42 ff., Fig. 6.
Aristotle, 191, 217.
Association, 94, 127, 140, 151, 158, 160; Centers, 44; Laws of, 190, 192; Neurones, 28.
Associationists, 246.
Atavism, 114.
Atomism, 151.
Attention, 72, 154, 156, 160.
Auditory Sense-area, 44.
Augustine, St., 191.
Automatism, 65, 76, 254.
Axis-cylinder Processes, 24.

Bacon, Francis, 217.
Baldwin, J. Mark, 235, 239, 240.
Barker, L. F., 27, 46, 150.
Barnes, Professor, 208.
Belief, 227.
Bennett, Dr. J. H., 90.
Berkeley, Bishop, 168.
Berti, 100.
Binet, Alfred, 50, 63, 64, 184.
Boswell, James, 197.
Bowne, B. P., 17, 184.
Braid, Dr. James, 238.
Brain, 39, ff.; Convolutions, 33; Weight of, 47.
Bunge, G., 48.

Calkins, Prof. Mary W., 193.
Cameron, Alexander, 209.
Cartesians, 69.
Cattell, J. McK., 156.
Cause and Effect, Idea of, 230.
Cell, The, 23; Varieties of the, 23.
Cerebellum, 40.
Cerebral Hemisphere, Fig. 5, 41.
Cerebro-spinal System, 34.
Cerebrum, 40.
Character, Habit of Willing, 97; Dual, 61.
Charcot, Dr., 210.
Cœnesthesis, 248.
Coleridge, S. T., 200.
Color Sensations, 139; Blind, 139.
Comparative Method, 19.
Complementary Colors, 139, Fig. 9, 141.
Concept, The, 213.
Conception, 211 ff., 224; as Habit, 94; and Imagination, 213.

Condillac, 58.
Conn, H. W., 107.
Consciousness, 24, 50 ff.; an Ultimate Reality, 21; Meaning of, 22; Alternating, 202; of Meaning, 211 ff.; Narrowing of, 237.
Consent, 77.
Contractibility of Cell, 233.
Cord, The Spinal, 39.
Cretins, 259.
Criminal, The, 260.
Critical Power, Suspension of, 236.

Darwin, Charles, 102, 103, 122.
Deception, 110.
Deduction, 217; Importance of, 219; Relation to Induction, 220.
Degeneracy, Symptoms of, 262.
Democritus, 149, 151.
Dendrites, 24.
Dessior, Max, 178.
Determinism, 82.
Development, Mental, 259.
Dewey, Professor John, 118, 121, 142.
Discharge Theory of Feelings, 120–123.
Discrimination, 151 ff., 183, 212; Analytic, 154.
Distance, of Sounds, 167; of Objects Seen, 168.
Doubting, 88.
Dramatic Sundering of the Ego, 255.
Dreaming, 54.

Ear, The, 34.
Eckhart, Master, 221.
Emotions, 118 ff.
Emotional Attitudes, 57, 120 ff.
Encephalon, Weight of, 47.
Epictetus, 244.
Epicurus, 84.
Epidemics, Mental, 242.
Equilibrium, Sensation of, 139.
Equipoise, Mental, 263.
Esquirol, Jean E. D., 250.
Ethical Instinct, 111.
Ethics, 87.
Evolution, 101.
Experimental Method, 20.
Extension in Perception, 159.
Externality, 148, 159.
Eye, The, 36, Fig. 3.

Fechner, Gustav Th., 145, 206.
Feeling, 118 ff.
Flammarion, Camille, 177, 178, 226.
Flechsig, Prof. P. E., 46, 89.
Fontana, 74.
Forgetting, 199, 238.
Fortuity in Perception, 164, Figs. 10 and 11.
Freedom of Will, 80; Limits of Freedom, 80.
Fusion, 151 ff.

Galton, Francis, 99, 142, 206, 207, 210.
Genius, 260.
Gilbert, Dr. Allen, 53, 187.
Goethe, 61.

Habit as "second nature," 96; Habits Changed, 96.
Habituation, 92 ff.; Law of, 92; Foundation of, 93; Scope of, 95.

Hall, G. Stanley, 266.
Hallucinations, 149, 161, 173; Viridical, 177.
Hawkins, C. J., 186.
Hearing, 34, 164; Center of, 44; Organ of, 34.
Helmholtz, Hermann, 32.
Heredity, 98 ff., 184; Theories of, 101.
Herbart, Johann Fr., 191.
Hering, Ewald, 184.
Höffding, Prof. Harold, 172.
Hudson, T. J., 222.
Hugo, Victor, 96.
Hume, David, 191, 231, 246.
Huxley, Thomas H., 70.
Hylan, J. B., 54.
Hyperæsthesia, 176, 234.
Hypermnesia, 200.
Hypnosis Defined, 238.
Hypnotism, 59, 176; How Induced, 237.

Idealism, 214.
Ideas, Innate, 104; Connate, 105.
Identity, Feeling of, 245.
Idiocy, 47, 259.
Illusions, 149, 161, 167, 170, Figs. 12 and 13.
Imagination, 74, 187, 205 ff., 213.
Imitation, 110, 235.
Impulses, 106; Without Consciousness, 112.
Induction, 217; as Conception, 218; Relation to Deduction, 219.
Inhibition, 77, 236.
Inquisitiveness, 111.
Insanity, 100, 264; Forms of, 265.
Instinct, 61, 106 ff.; Reactions, 108, 113; Premature, 114; Atavistic, 114; Perverse, 115.
Intensity of Sensations, 143.
Interest, Spheres of, 83 ff.
Interpretation of Perception, 160.
Introspection, 18.
Intuition, 222.
Irresolution, 87.

James, William, 20, 120, 123, 131, 152, 153, 206, 207, 221, 234, 247, 261.
James-Lange Theory, 120.
Jastrow, Joseph, 182.
Joint-sensations, 138.

Kant, 84, 152, 213, 230.
Kinetic Will, 73.
Kirkpatrick, E. A., 199.
Knowledge, 118, 223 ff.; Elements of, 223; Growth of, 225.
Külpe, Oswald, 119, 188.

Ladd, G. T., 69, 119, 126, 254, 255, 258.
Lalande, A., 195.
Lamarck, Prof. Jean, 101.
Lange, N., 54.
Language, 214.
Legroux, 199.
Leibniz, Gottfried W., 51.
Lessing, Gotthold E., 85.
Life, Nature of, 22; Beginning of, 23.
Lipps, Theod., 16.
Lobes, Cerebral, 41.
Localization of Mental Functions, 45 ff.; Sound, 166.
Local Signs, 147, 167.

Locke, John, 105, 184, 199.
Lombroso, Cesare, 101, 262.
Lotze, Hermann, 168, 172.

Macnish, R., 254.
Martineau, Dr. James, 84.
Masson's Disk, 54, Figs. 7 and 8.
Mayr, Georg von, 100.
McDougall, R., 47.
McMaster, John B., 243.
Measurement of Sensations, 143.
Medulla Oblongata, 40.
Memorial Integration, 201.
Memory, 99, 184, 238; Organic, 183; Maximum Power of, 186; Ideas, 187; Capacity of, 197; Kinds of, 198; Cultivation of, 202; and Cœnesthesia, 248.
Metabolism, 47.
Mercier, Charles, 62, 116, 249.
Metaphysics, 15.
Methods in Psychology, 18.
Meynert, Theodor, 124.
Mill, J. S., 84, 191.
Mind, 17, 22, 59.
Mnemonics, 204.
Modern Criticism, 150.
Mood, 163.
Motive, 78.
Motives, 83; Development of, 87.
Motor Control, 76.
Münsterberg, Hugo, 166.
Muscular, Change and Consciousness, 56; Sensations, 138.
Mysticism, 221.
Mythopœic Tendency, 201.

Nativism, 160.
Nerve-impulses, 26.
Nervous System, 22.
Neuroglia, 24.
Neurones, The, 24; Figs. 1 and 2; Estimated Number of, 26; The Function of, 27; Classes of, 27.
Newton, Sir Isaac, 218.
Nisbet, J. F., 162.
Nominalism, 214.
Nordau, Max, 261.
Number in Perception, 159.

Objective Method, 19.
Olfactory Cells, 34; Area, 44.
Optic Nerve, 139.
Originality, 260.
Origin of Perception of Externality, 159.
Osborn, H. F., 104.

Parallelism of Neural and Mental Activities, 47.
Paralysis of Will, 88.
Paramnesia, 195.
Pathology, 17.
Patrick, Prof. G. T. W., 53, 187.
Perception, 158 ff., 213, 219.
Philo the Jew, 60.
Phonism, 142.
Photism, 142.
Phrenology, 46.
Physical Basis, 22 ff.
Pick, Dr. Arnold, 195.
Plato, 111, 214, 221.
Play, 110.
Pleasure-pain, 146.
Plotinus, 221.
Plutarch, 173.
Podmore, Frank, 178.
Porter, Gen. Horace, 204.
Porter, Noah, 203.
Pragmatism, 84, 172.
Precocity, 261.

Preyer, W. T., 166, 240.
Primacy of Impressions, 193.
Protoplasm, 23.
Psychical Phenomena, 13, 175.
Psychology, Aim of, 13 ff.
Psycho-physics, 20.

Quality of Objects, 158.

Reaction Time, 32.
Reactions, Instinct, 108.
Realism, 214.
Reality, Idea of, 228; Feeling of, 229, 236.
Reason, 113; and Insanity, 264.
Recall, 187.
Recognition, 194; Pseudo, 195; and Knowing, 196.
Recollection, Variable, 189; Basis of, 189.
Reflexes, 30.
Reproduction, 190; Sporadic, 193.
Retention, 184; Degrees of, 185; Basis of, 186.
Retina, Structure of, Fig. 4, 37.
Ribot, Th., 57, 89, 91, 99, 190, 191, 247, 250.
Romanes, G. J., 113, 177.

Sanity, 263.
Self, The, 244 ff.; Changes of, 247, 250.
Schelling, F. W. J. von, 221.
Schmoll, Anton, 178.
Scholastics. 190, 246.
Sensation, 124, 136 ff.; Kinesthetic, 77; Experienced in Groups, 158.
Sensationalists, 58.
Sensory Nerve-endings, 34, 136; Neurones, 24.
Servi, 100.
Sexual Instinct, 109.
Shakespeare, 65, 126, 130.
Shaw, John C., 187.
Sherrington, Dr. Charles S., 122.
Sidis, Dr. Boris, 65, 239.
Sight, Organ of, 36, 139, 168.
Sleep, 54.
Smell, 137, 164; Organ of, 34.
Socrates, 60.
Solomons, L. M., 257.
Somæsthetic Area, 44.
Sophists, 15.
Soul, 59.
Sound, 138, 164.
Space, Idea of, 229.
Spatiality, 148.
Spatial Position, 159.
Spencer, Herbert, 22.
Spinal Cord, 30, 39.
Spinoza, 221.
Spitzka, Dr. E. C., 266.
Starbuck, E. D., 221.
Starr, M. Allen, 46.
St. Augustine, 191.
Stein, Gertrude, 257.
Stetson, R. H., 207, 209.
Stoics, 84.
Stream of Consciousness, 59.
Stricker, 208.
St. Teresa, 126.
Stumpf, Professor, 166.
Subconscious Activity, 67 ff.; Explanation of, 67.
Subjective Sensations, 149.
Suggestion, 162, 163, 233 ff.
Synæsthesia, 142.
Synthesis, 151.

Taste, 138, 165; Area, 44.
Teleology of Feeling, 122, 130.
Telepathic Experiments, 177, Figs. 14–45.
Telepathy, 177, 182.
Temperaments, 258.
Temperature Spots, 138.
Teresa, St., 126.
Thinking, 75, 216 ff.
Thought and Movement, 233.
Thought-movements, 217.
Thought-transference, 177, 182.
Threshold Value of Sensation, 143, 146.
Timon, 170.
Tolstoy, Count Leo, 163.
Tone of Feelings, 124, 125.
Touch, 132, 138, 167.
Types, Mental, 257.

Understanding, 227.
Unexplained Mental Phenomena, 175 ff.
Unity of Nervous System, 47.

Verga, 100.
Virchow, Prof. Rudolf, 260.
Visual Center, 43.
Volume of Sensation, 148.
Voluntarism, 71.

Wakefulness, 58.
Weber, E. F., 74.
Weber, E. H., 144, 147.
Weber's Law, 144.
Weismann, Prof. August, 103.
White, Dr. Wm. A., 265.
Will, 41, 51 ff.; the Self, 245.
Winslow, Forbes, 198.
Wundt, Wilhelm, 122, 124, 258.

Zacchias, 264.

LIBRARY OF CONGRESS
0 020 198 852 4